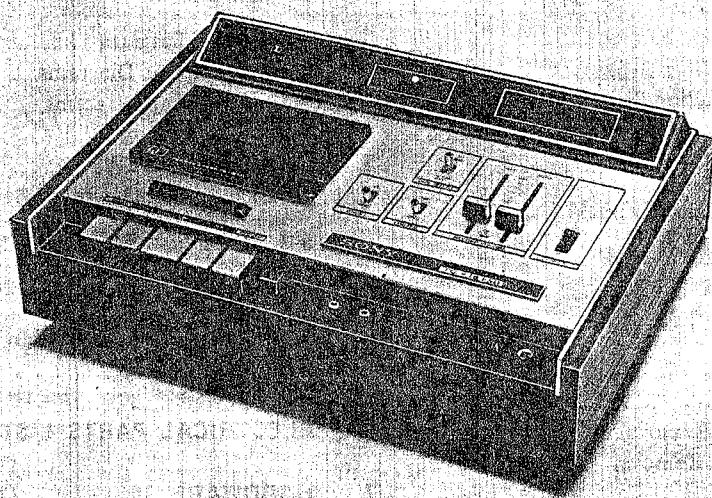


# TC-161SD

*General Export Model  
AEP Model*



## SPECIFICATIONS

<b>Power Requirements:</b>	AC 110, 127, 220 or 240 V, 50/60 Hz, 25 W (AEP) AC 100, 110, 120, 127, 220 or 240 V, 50/60 Hz, 18 W (General Export)	<b>Outputs:</b> LINE OUT (two) Impedance : greater than 10 kΩ Output level : 0.78 V (0 dB) with 100 kΩ load
<b>Track System:</b>	Four-track two-channel stereo	HEADPHONE Impedance : 8 Ω Output level : 31 mV (-28 dB)
<b>Tape:</b>	SONY tape cassette or equivalent	REC/PB (DIN) Connector: Input Impedance : 3.7 kΩ Output Impedance : 7.0 kΩ
<b>Tape Speed:</b>	1 7/8 ips (4.8 cm/s)	Semiconductors: 2 FET, 40 transistors and 30 diodes
<b>Recording Time:</b>	2.0 hrs total (with cassette C-120)	Motor: HC-414 B (hysteresis motor)
<b>Frequency Response:</b>	NAB 20 ~ 17,000 Hz with chromium dioxide cassette 20 ~ 15,000 Hz with ordinary cassette DIN 40 ~ 15,000 Hz with chromium dioxide cassette 40 ~ 12,500 Hz with ordinary cassette	Record/Playback Head: PF 133-3602 (1 kΩ/1 kHz)
<b>Signal-to-Noise Ratio:</b>	49 dB (DOLBY switch OFF) With DOLBY switch ON, S/N improves 5 dB at 1 kHz and 10 dB at 5 kHz.	Erase Head: EF 110-36E (400 Ω/50 kHz)
<b>Wow and Flutter:</b>	0.1 % WRMS (weighted root mean square) (± 0.3 % DIN)	Dimensions: 15 3/4 (W) x 5 (H) x 10 7/8 (D) (400 x 127 x 276 mm)
<b>Recording Bias Frequency:</b>	Approx. 85 kHz	Weight: 14 lb 4 oz (6.6 kg)
<b>Inputs:</b>	MICROPHONE(two) Impedance : low impedance Maximum sensitivity : 0.2 mV (-72 dB)	
	LINE IN (two) Impedance : 100 kΩ Maximum sensitivity : 60 mV (-22 dB)	

**SONY®**  
**SERVICE MANUAL**

## TABLE OF CONTENTS

<u>Section</u>	<u>Title</u>	<u>Page</u>	<u>Section</u>	<u>Title</u>	<u>Page</u>
	Specifications . . . . .	1	4.	DIAGRAMS	
<b>1. OUTLINE</b>			4-1.	Level Diagram . . . . .	28
1-1.	DOLBY Noise Reduction System . . .	3	4-2.	Schematic Diagrams . . . . .	30
1-2.	System Control Circuit Description .	5	4-3.	Mounting Diagrams . . . . .	33
1-3.	Block Diagram . . . . .	7	<b>5. EXPLODED VIEWS</b>		
1-4.	Cabinet Front View . . . . .	8	5-1.	Packing . . . . .	36
1-5.	Cabinet Rear View . . . . .	8	5-2.	Cabinet - Top View - . . . . .	37
1-6.	Chassis Top View . . . . .	9	5-3.	Buttons . . . . .	38
1-7.	Chassis Bottom View . . . . .	9	5-4.	Chassis - Top View - . . . . .	39
<b>2. DISASSEMBLY</b>			5-5.	Chassis - Bottom View - . . . . .	41
2-1.	Cabinet Removal . . . . .	10	5-6.	Amp Chassis . . . . .	43
2-2.	Head Adjusting Lid Removal . . . . .	11	<b>6. ELECTRICAL PARTS LIST</b>		
2-3.	Upper Cassette Case Removal . . . . .	11	6.	ELECTRICAL PARTS LIST . . . . .	45
<b>3. ADJUSTMENTS</b>			<b>7. HARDWARE</b>		
3-1.	Mechanical Adjustments . . . . .	13	7.	HARDWARE . . . . .	49
3-2.	Electrical Adjustments and Measurements . . . . .	19			

When ordering replacement parts, use PART NUMBERS listed in Parts Lists or shown in EXPLODED VIEWS.  
Parts List reference numbers should not be used.

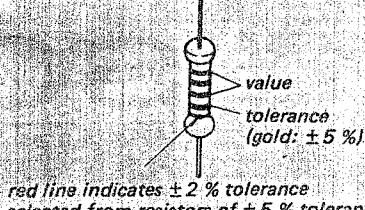
All screws in this service manual are Phillips type (cross recess type) unless otherwise indicated.  
(-) : slotted head

## CAUTION

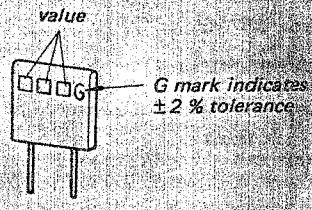
1. Record and playback level adjustments should be carefully made. The levels must be as specified for correct DOLBY circuit operation.
2. When replacing resistors and capacitors needing  $\pm 2\%$  tolerance, use only those with red line or G mark, as DOLBY system requires precise circuit operation.

 $\pm 2\%$  Tolerance Identification

## Resistor



## Capacitor



# SECTION 1

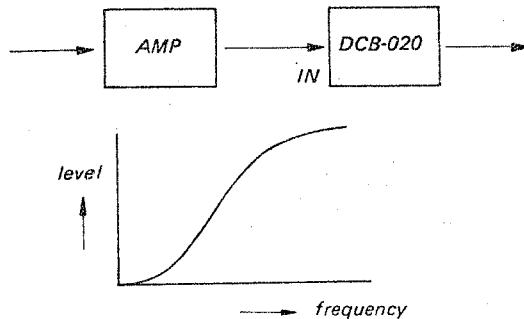
## OUTLINE

### 1-1. DOLBY NOISE REDUCTION SYSTEM

#### 1. OUTLINE

The TC-161SD uses a DOLBY NOISE REDUCTION system to reduce hissing noise during low level or zero level sound passages. This system pre-emphasizes the low-level high-frequency recorded signals which are disturbed by hissing noise. During playback, it de-emphasizes these signals along with tape hiss and thus improves signal-to-noise ratio.

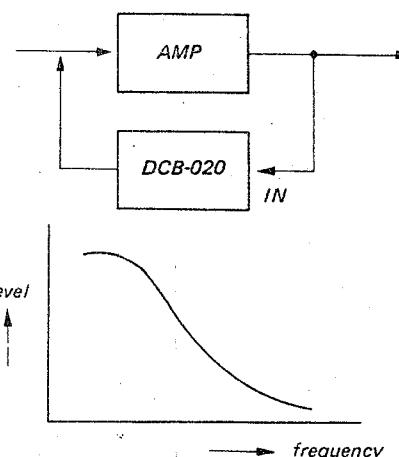
- (1) The DOLBY system differs from other noise reduction systems as follows:
  - \* High-fidelity sound cannot be obtained if the DOLBYIZED tape is played back on other systems or vice versa.
  - \* Signal levels must be precisely adjusted since these levels control the DOLBY system.
- (2) The DOLBY system of the TC-161SD has the following features:  
The DOLBY unit (DCB-020) contains a variable high-pass filter controlled by input level. During Record:  
The DOLBY unit (DCB-020) is series-connected to boost the low-level high-frequency signal.



*Fig. 1-1. Unit connection in record mode and frequency response*

During Playback:

The DOLBY unit is connected as a negative feedback circuit to decrease the gain for low-level high frequency signals boosted during record.

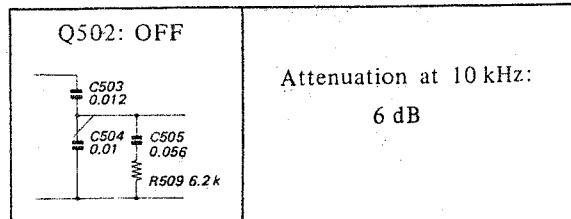


*Fig. 1-2. Unit connection in playback mode and frequency response*

#### 2. CIRCUIT OPERATION

(Refer to schematic diagram on page 30)

Stage/Control	Function
R501, R502	These resistors attenuate signal level 20 dB. High resistance value is due to high output impedance of LINE OUT jack since DOLBY unit input is connected to LINE OUT jack.
Q501	This emitter-follower amplifier is an impedance-translator for the low-impedance high-pass filter.
filter C503, C504, C505 R509, Q502	Q502 changes the filter curve determined by C503, C504, C505 and R509.





## 1-2. SYSTEM CONTROL CIRCUIT DESCRIPTION (Refer to schematic diagram on page 6.)

The TC-161SD uses two automatic stop mechanisms;

1. In playback, record, rewind or fast forward mode, SONY Magnetodiode \* detects reel spindle stop at tape end and operates tape stop mechanism.
2. In rewind mode, switch built in tape index counter operates tape stop mechanism, at 000 counter reading.

\* : The diode developed by SONY is extremely sensitive to magnetic field.

### Automatic Stop Function at Tape End

In playback, record, rewind or fast forward mode:

1. Ferrite magnet ring belt-driven by supply reel spindle rotates.
2. Magnetodiode D401 detects magnetic field variation produced by ferrite magnet ring rotation as an AC signal.
3. The AC signal is amplified by transistors Q401 and Q402, and rectified by diodes D402 and D403.
4. Rectified DC voltage charges C405 and charging current flows through C405 and R413 since the rectified DC voltage is higher than B + voltage divided by R412 and R413.
5. Rectified DC voltage turns Q404 ON and decreased collector voltage of Q404 turns Q405 and Q406 OFF.
6. Solenoid PM 1 remains de-energized.

At tape end:

1. Ferrite magnet ring stops.
2. D401 detects magnetic field variation stop.
3. Due to no AC signal input to Q401, current flow to D403 stops.
4. C405 discharges through R419, Q404 emitter and R429.
5. After the discharge, Q404 turns OFF and conducts Q405 and Q406.

**Note:** In playback, record, rewind or fast forward mode, S3-4, S13 or S14 ground DC bias supply circuit used for Q404 base.

6. Solenoid PM 1 is energized and stops tape transport mechanism.

Starting:

1. In stop mode, DC bias is applied to Q404 base through R417, R418 and R419 and Q404 turns ON.
2. With forward, rewind or fast forward button depressed, ferrite magnet ring starts to rotate and turns Q404 ON before S3-4, S13 or S14 ground DC bias supply circuit used for Q404 base.
3. Solenoid PM 1 remains de-energized.

### Manual Stop Function

1. With STOP button depressed, S11 closes. Voltage across C405 increases and charging current flows through C405.
2. This charging current decreases Q404 base voltage.
3. Q404 turns OFF, solenoid PM 1 is energized and stops tape transport mechanism.

### Manual Pause Function

1. With PAUSE button depressed, S12 closes and supplies bias voltage to Q404 base through R414 and R419.
2. Q404 turns ON and solenoid PM 1 remains de-energized.

### Memory Counter Stop Function

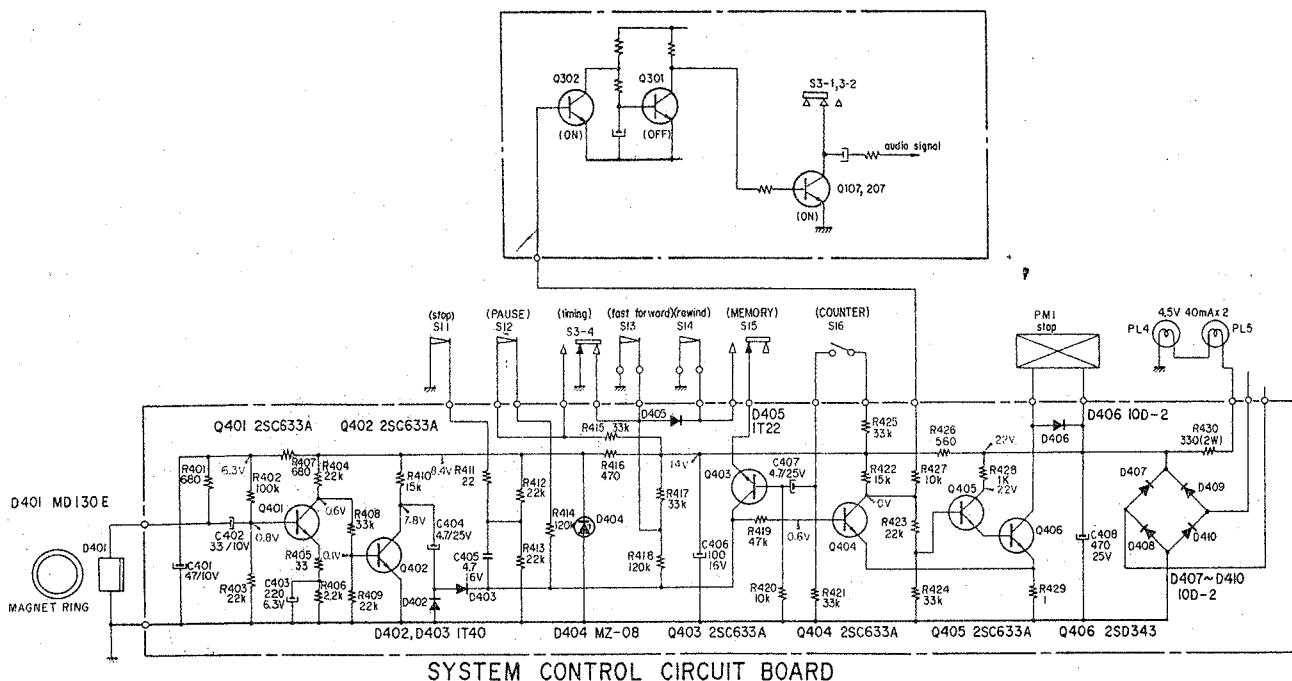
In rewind mode, tape transport automatically stops when tape index counter indicates 000. This function is useful for repeated playback of desired tape portion.

1. When tape counter indicates 000, S16 closes and turns Q403 ON during charging of C407. Then Q404 base bias is grounded through Q403, S15 and S14. Solenoid PM 1 is energized.
2. D405 operates the memory counter system only in rewind mode.

### Muting Circuit

When STOP button is depressed, muting circuit eliminates click noises as follows:

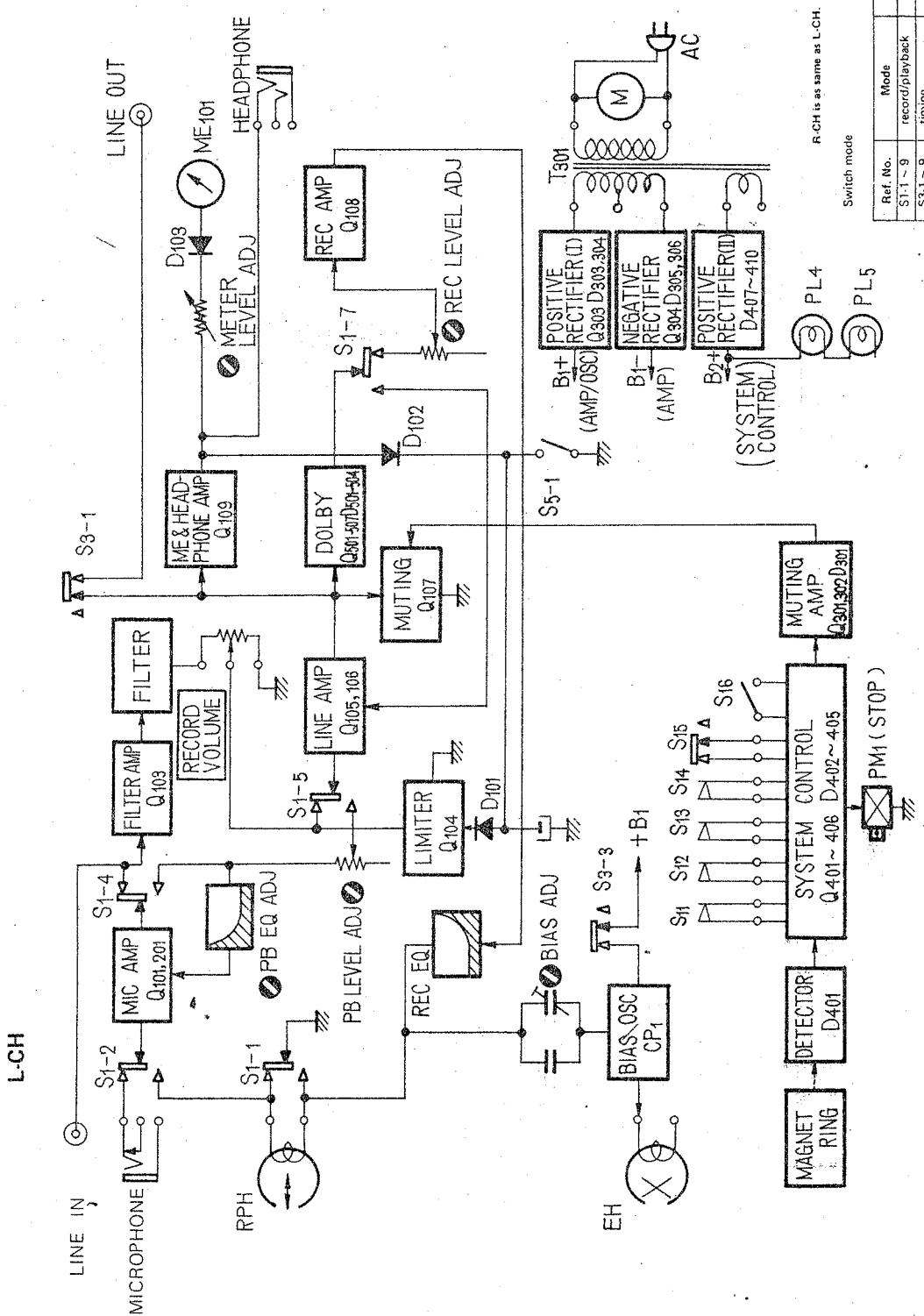
1. STOP switch (S11) closes and turns Q404 OFF.
2. Increased collector voltage of Q404 turns Q302 ON.
3. Q301 turns OFF.
4. Q301 collector voltage becomes higher than zener voltage of D301 and turns Q107 and Q207 ON.
5. Q107 and Q207 ground audio signal circuits, thus click noises are eliminated.



#### TROUBLE SHOOTING

Symptom	Cause
No automatic stop at tape end.	1. Timing switch (S3) defective. 2. Fast forward switch (S13) defective. 4. Rewind switch (S14) defective. 5. Solenoid defective. 6. System control circuit board defective.
Automatic stop during tape movement.	1. D401 incorrectly positioned. 2. No magnetic ring rotation. (caused by belt slip)
Automatic stop in PAUSE mode.	1. SMD incorrectly positioned. 2. PAUSE switch (S12) defective.
Function buttons fail to lock.	1. D401 defective. 2. Magnetic ring loose.
Automatic stop after any function button locks.	3. D402 defective. 4. System control circuit board defective.
MEMORY COUNTER inoperative.	1. MEMORY switch (S15) defective. 2. Solenoid defective. 3. COUNTER switch (S16) defective.

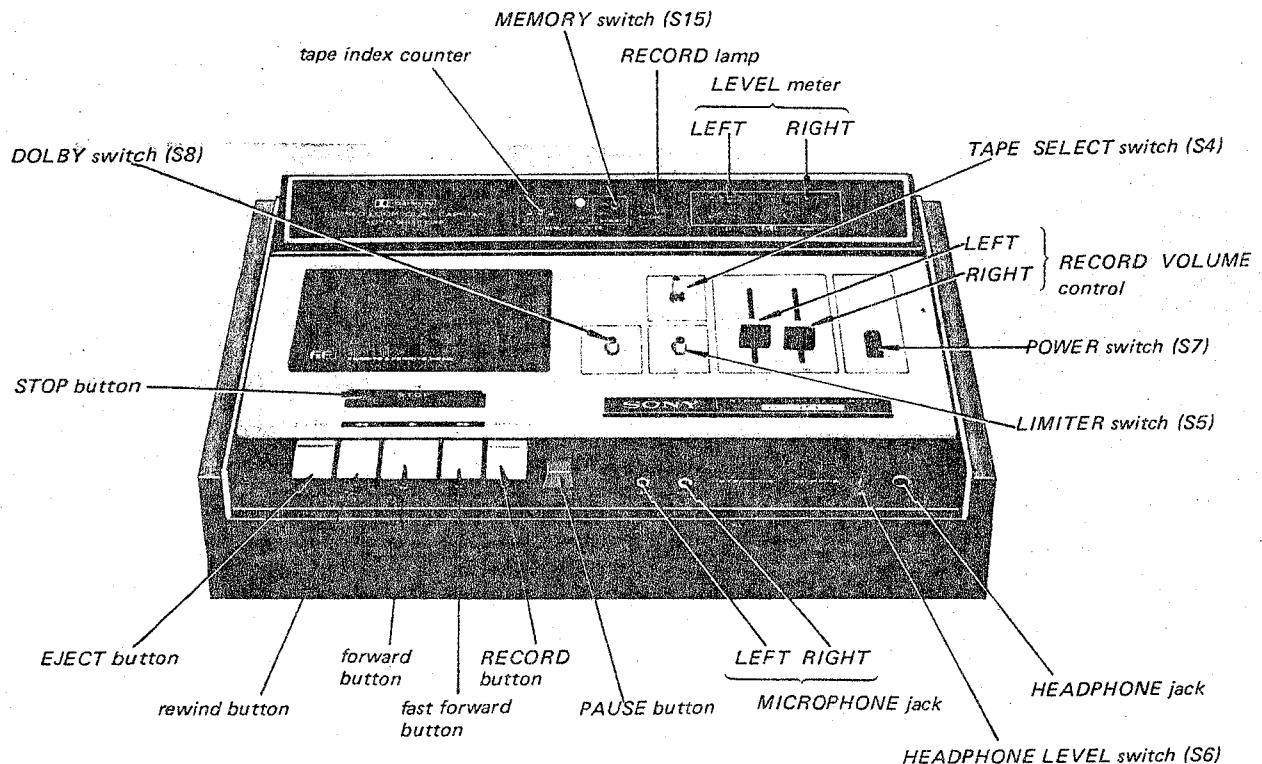
## 1-3. BLOCK DIAGRAM



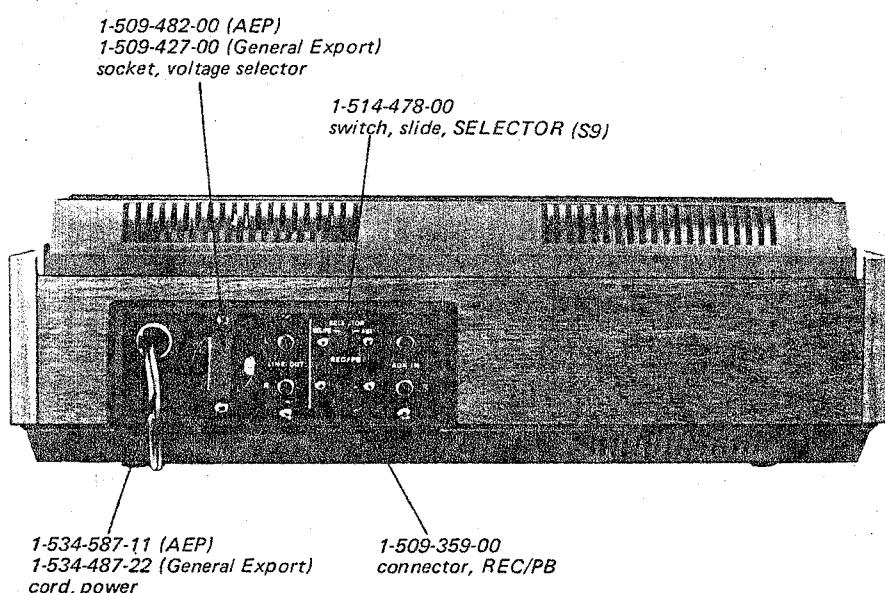
Ref. No.	Mode	Switch
S1-1 ~ 9	record/playback	record
S3-1 ~ 9	timing	ON
S5-1	LIMITER	OFF
S11	stop	OFF
S12	PAUSE	OFF
S13	fast forward	OFF
S14	rewind	OFF
S15	MEMORY	OFF
S16	COUNTER	OFF

# IC-161SD

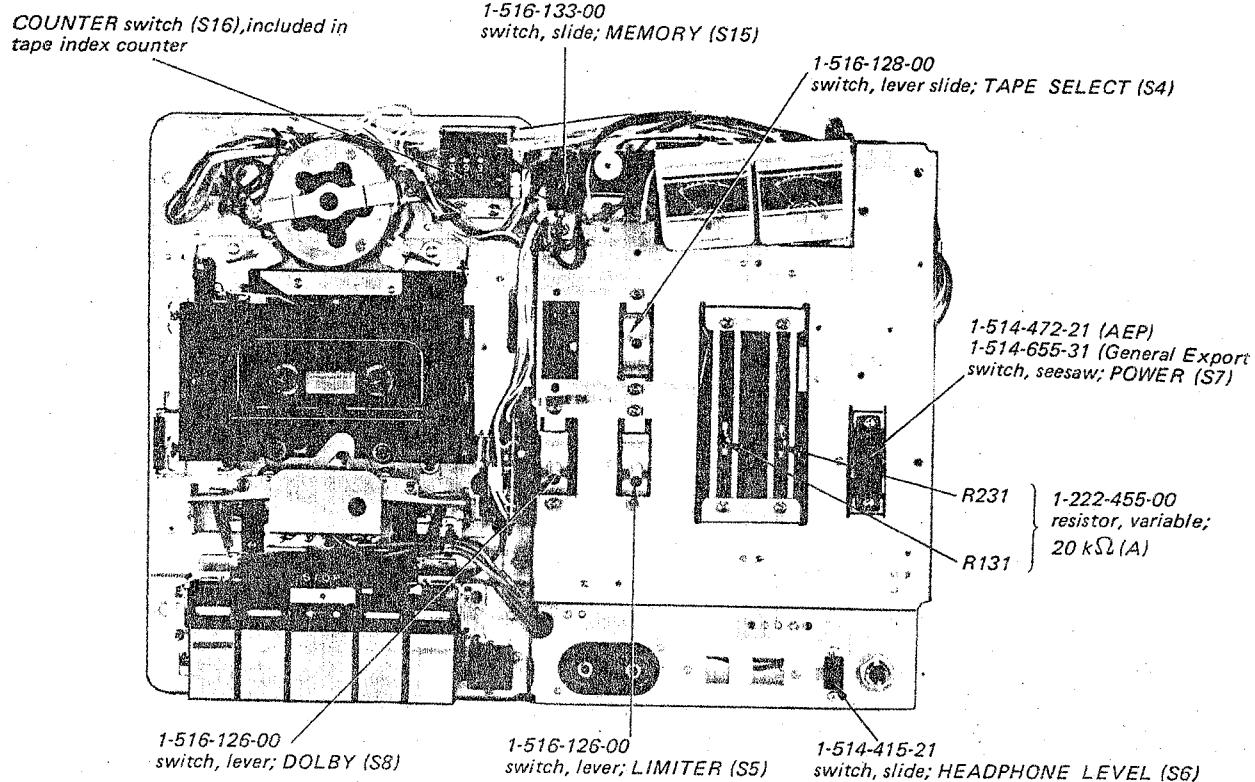
## 1-4. CABINET FRONT VIEW



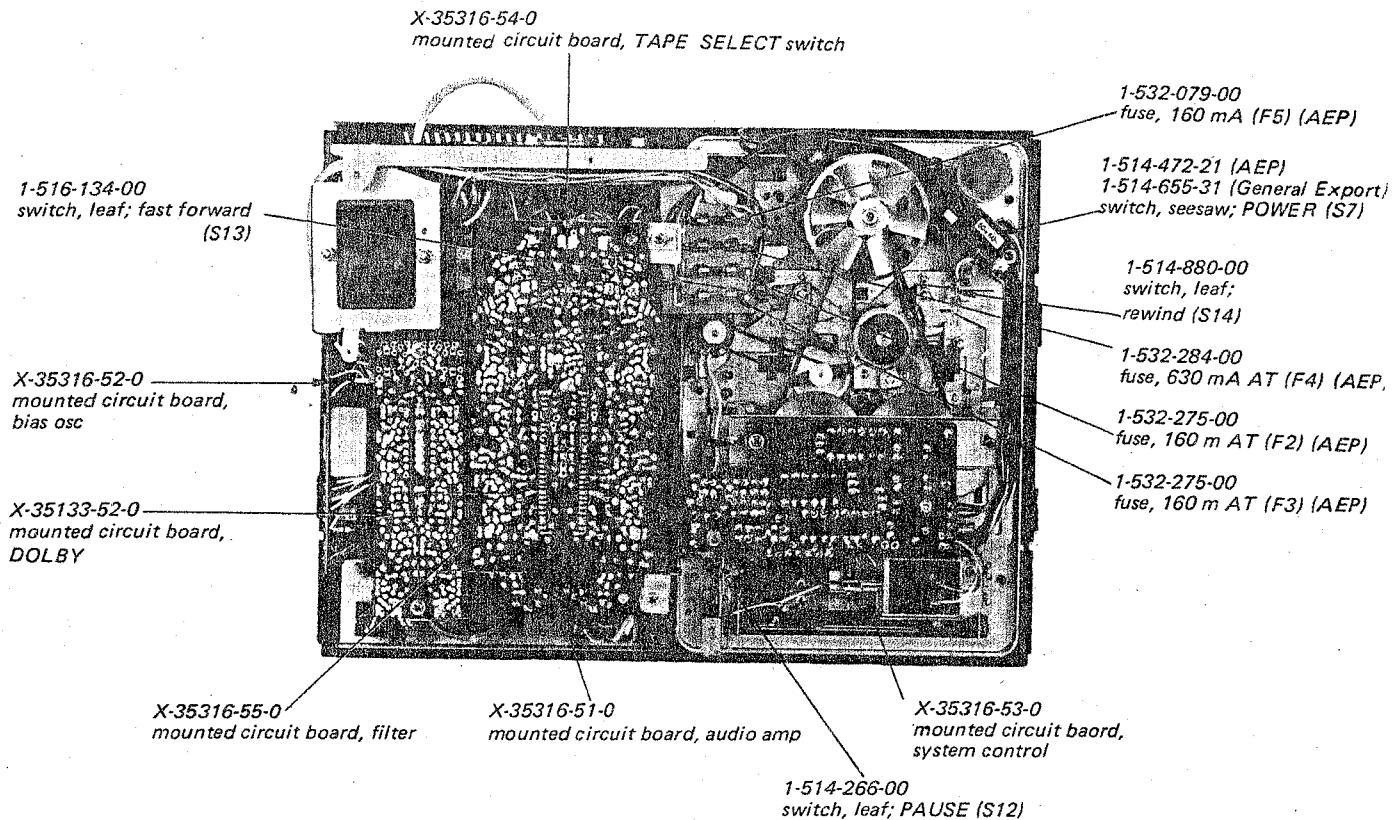
## 1-5. CABINET REAR VIEW



## 1-6. CHASSIS TOP VIEW



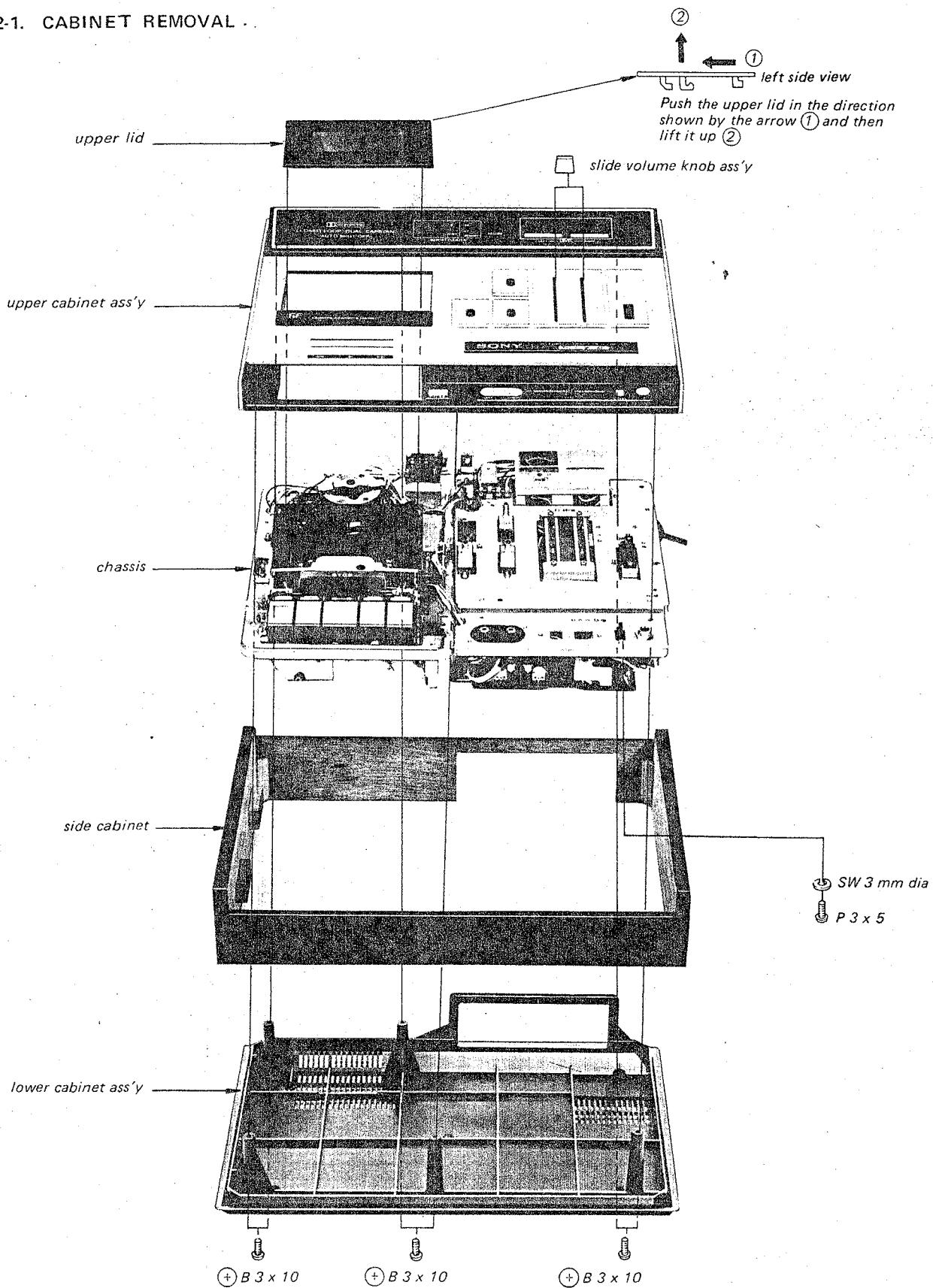
## 1-7. CHASSIS BOTTOM VIEW



C-161SD

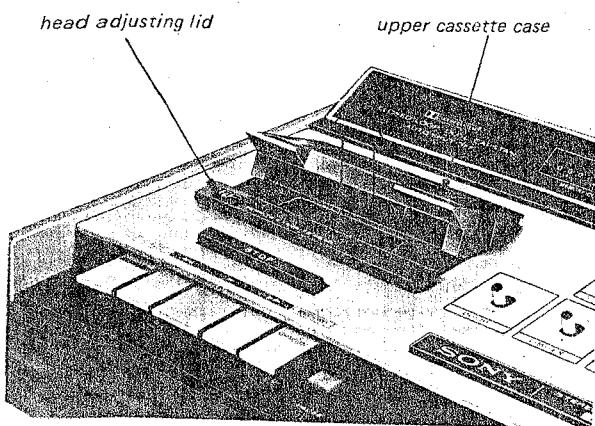
## SECTION 2 DISASSEMBLY

### 2-1. CABINET REMOVAL



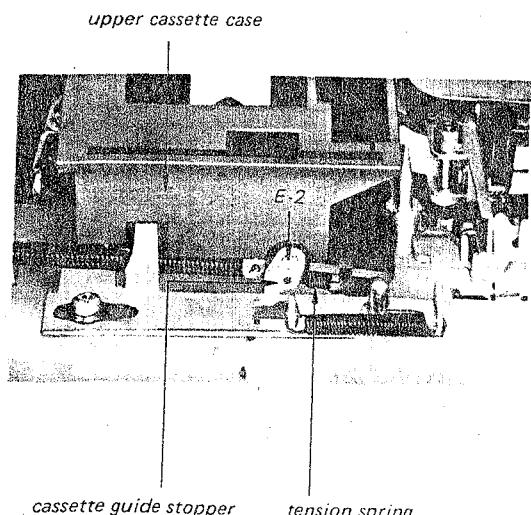
## 2-2. HEAD ADJUSTING LID REMOVAL

Remove head adjusting lid by pulling in the direction shown by the arrow and record/playback head azimuth adjustment can be made.



## 2-3. UPPER CASSETTE CASE REMOVAL

- (1) Remove retaining ring (E-2).
- (2) Remove tension spring.
- (3) Remove cassette guide stopper.
- (4) Remove cassette case in the direction shown by arrow.



### CAUTION

#### 1. Head Deck Stopper

Remove the stopper only when necessary. Slight movement of the stopper may badly affect tape path. When removing the stopper, perform "Timing Switch (S3) Adjustment" on page 14.

#### 2. Left Pinch lever Assembly and Record/playback Head

Do not replace left pinch lever assembly and record/playback head at the same time. If necessary, replace one part only and adjust it in reference to the other.

**Note:** Refer to Tape Path Adjustment on page 19 and Head Height Adjustment on page 20.

After tape path parts replacement or tape path adjustments, perform the following adjustment and measurements:

1. Azimuth Adjustment on page 20.
2. Overall Frequency Response Measurement on page 24.
3. Erase Ratio Measurement on page 25.
4. Cross-talk Measurement on page 26.
3. Tape Tension Check  
(After flywheel replacement)

1. Prepare alignment tape cassette (See "how to make an alignment tape cassette" on page 19) and load it in the unit.

2. Place unit in forward mode.
3. Turn the power switch off and depress PAUSE button.
4. Slacken the tape by approximately 10mm ( $\frac{3}{8}$ ") between left pinch roller and erase head.
5. Release PAUSE button and turn power switch on.
6. Make sure that tape recovers normal tape tension within two minutes.
7. If necessary, replace the other flywheel.

**Note:** When two flywheels with the same diameters are used, take-up capstan rotates slightly faster than supply. If the diameter of supply flywheel is slightly smaller than take-up, slack tape will not recover the normal tape tension.

8. Repeat steps 1 through 6, after replacing flywheels.

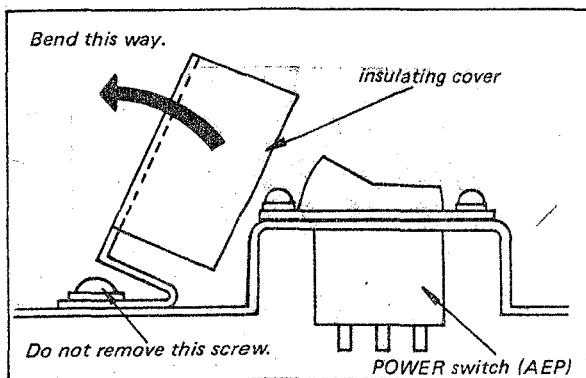
**Note:** Do not spill oil on the belt nor twist the belt.

## TC-161SD

### 4. POWER Switch (AEP) Replacement.

Proceed as shown.

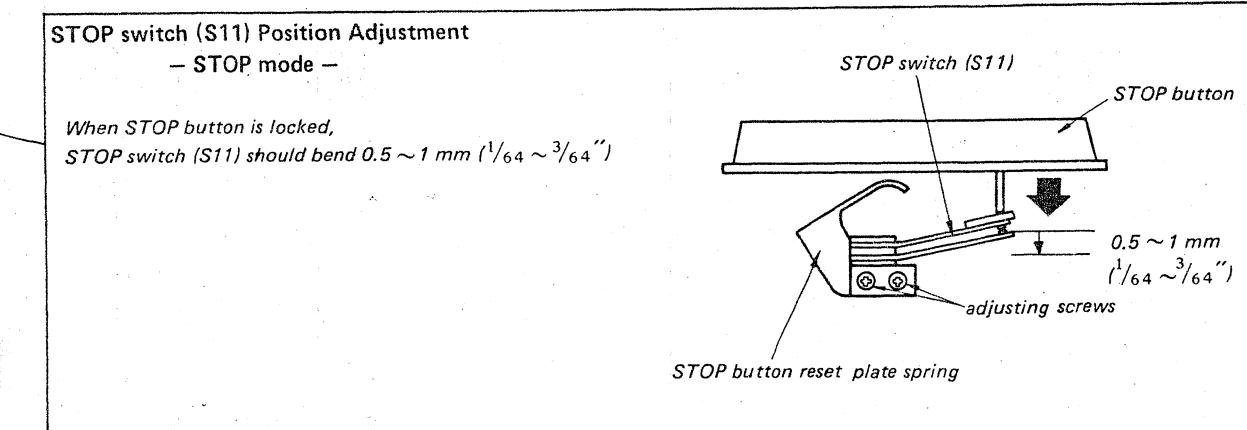
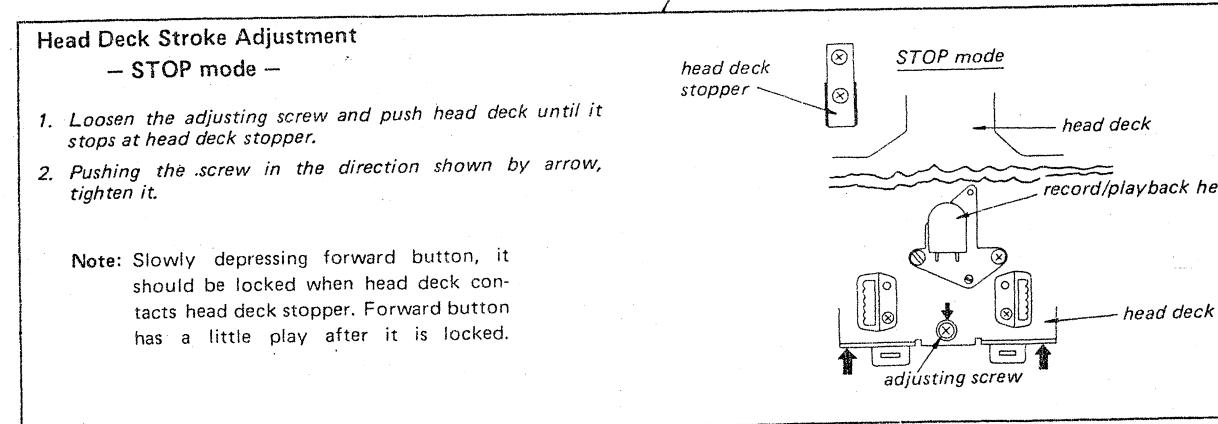
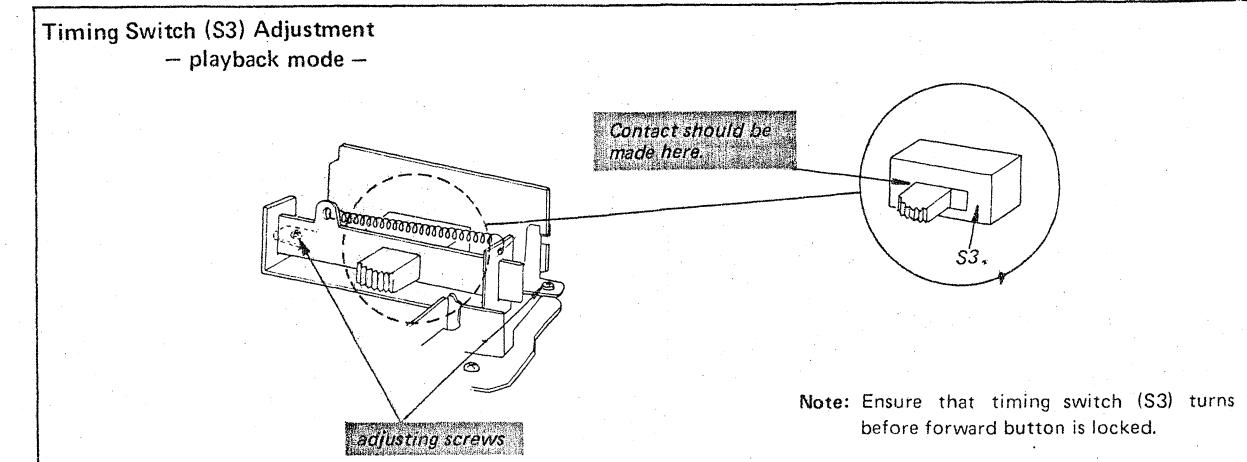
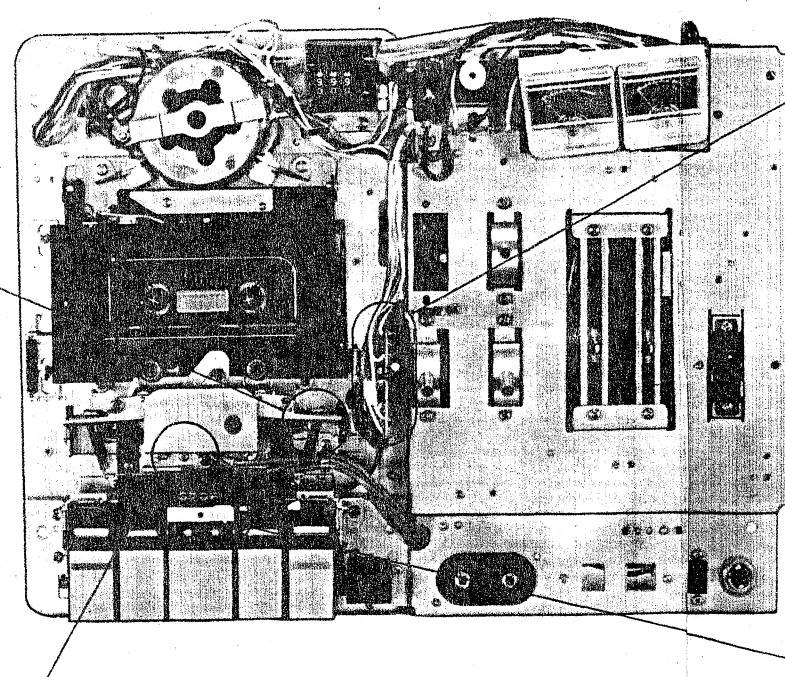
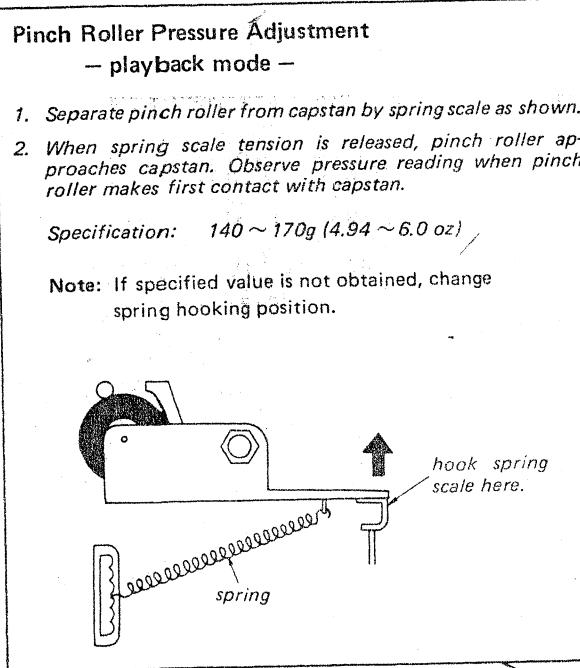
(Do not remove insulating cover.)



## SECTION 3

### ADJUSTMENTS

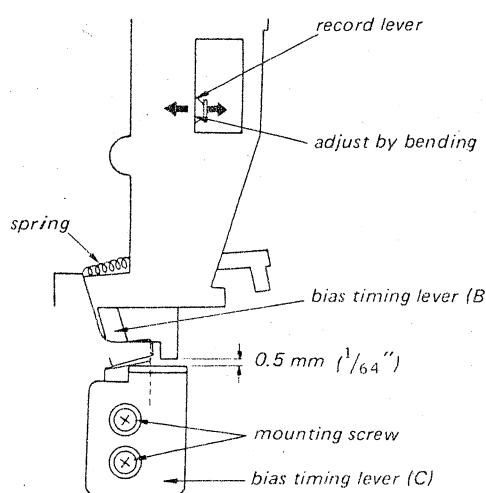
#### 3-2. MECHANICAL ADJUSTMENTS



### Bias Timing Adjustment — RECORD mode —

- When STOP button is slowly pushed, record button should be released after forward button is released. If necessary, proceed as follows.
- Adjust the position of bias timing lever (C) by loosening the mounting screws so that the clearance between bias timing lever (B) and bias timing lever (C) is 0.5 mm ( $\frac{1}{64}$ ") in record mode.
- Bend record lever so that the tip of bias timing lever (B) meets the center position of bias timing lever (C) as shown. If necessary, replace spring.

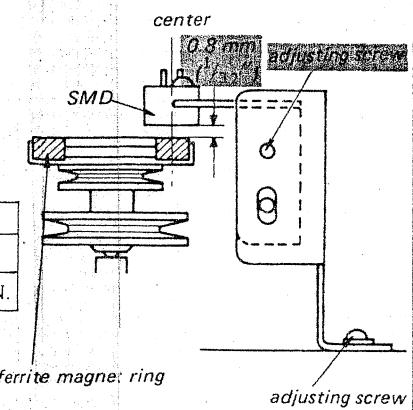
Note: If specified position is not obtained, a click noise will be recorded on the tape.



### SMD Adjustment

Note:

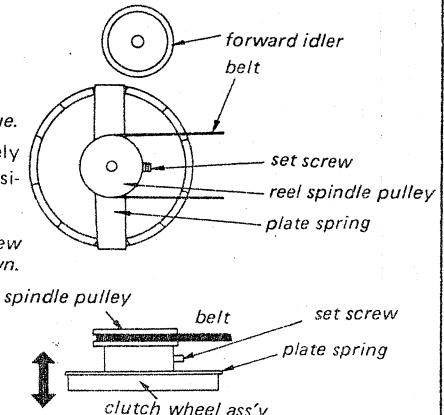
clearance	Symptoms
more than 0.8 mm	autostopped near tape end
less than 0.8 mm	autostopped with PAUSE button ON.



### Playback Torque Adjustment — playback mode —

Playback torque with torque meter.  
Specifications:  $45 \sim 55 \text{ g} \cdot \text{cm}$  ( $0.63 \sim 0.76 \text{ oz} \cdot \text{inch}$ )  
If necessary, proceed as follows.

- Change lock position of plate spring for specified torque.  
Note: Playback torque changes approximately  $5 \text{ g} \cdot \text{cm}$  ( $0.07 \text{ oz} \cdot \text{inch}$ ) each lock position.
- If satisfactory results cannot be obtained, loosen set screw and adjust by moving reel spindle pulley up or down.

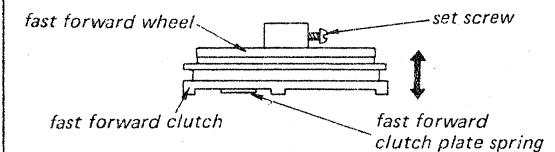


### Fast Forward and Rewind Torque Adjustment — fast forward and rewind mode —

Specifications: fast forward; more than  $70 \text{ g} \cdot \text{cm}$  ( $1 \text{ oz} \cdot \text{inch}$ )  
rewind;  $80 \sim 100 \text{ g} \cdot \text{cm}$  ( $1.1 \sim 1.4 \text{ oz} \cdot \text{inch}$ )

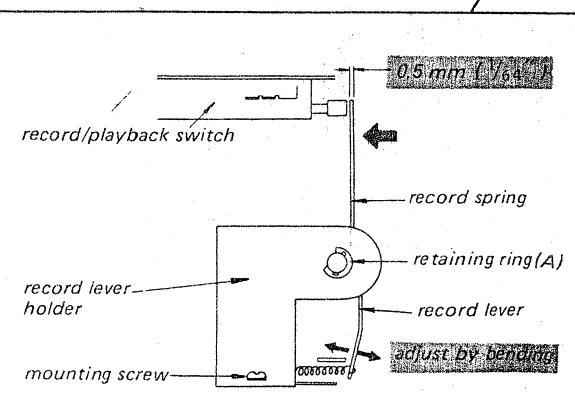
If necessary, proceed as follows:

- Loosen set screw and adjust by moving fast forward wheel up or down for specified torque.
- If satisfactory results cannot be obtained yet, adjust by changing locking position of fast forward clutch plate spring.



### Record Lever Adjustment — STOP mode —

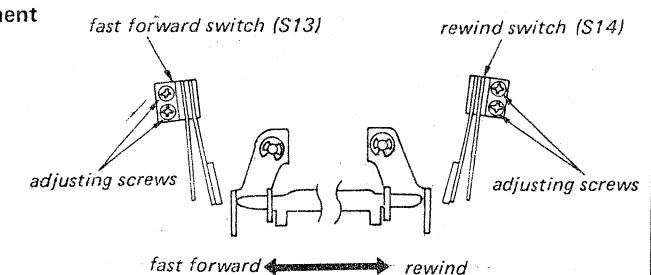
- Note: 1. This adjustment should be made after removing record lever holder by removing retaining ring (A).  
2. When RECORD button is locked, there should be no clearance between record spring and record/playback switch.



### Fast Forward and Rewind Switch (S13, S14) Adjustment

#### — fast forward and rewind-modes —

Turn adjusting screws so that fast forward switch and rewind switch close and switch leaves further bend  $0.5 \sim 1 \text{ mm}$  ( $\frac{1}{64} \sim \frac{3}{64}$ ").



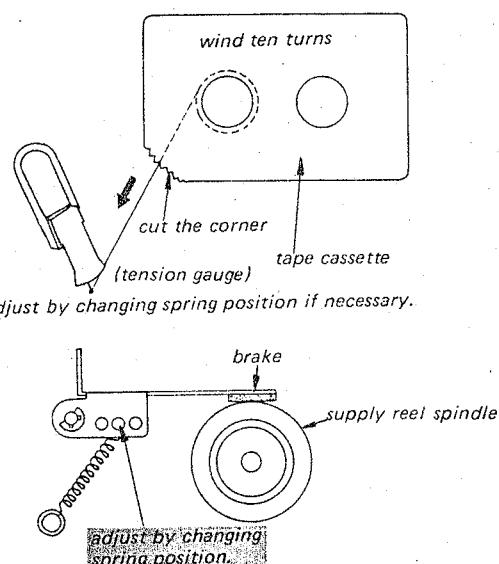
### Back-Tension Torque Measurement — playback mode —

1. Cut corner of tape cassette as shown.
2. Load cassette and set to playback mode with no ac power input.
3. Lock PAUSE button.
4. Tie the tape to the end of tension gauge and pull horizontally in the direction shown by arrow at a speed of 4.8 cm/s.

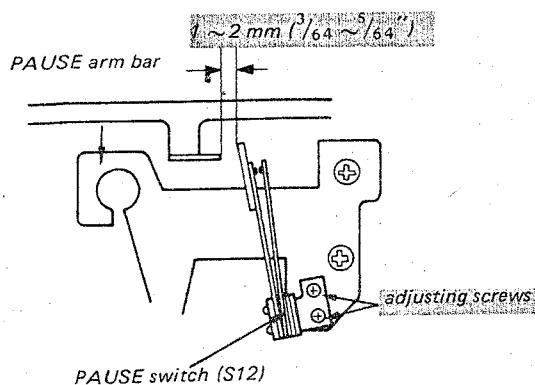
back-tension torque = (reading on tension gauge)  $\times 1.1$

Specifications: 10 ~ 15 g · cm (0.14 ~ 0.21 oz · inch)

Specifications for rewind back-tension:  
less than 12 g · cm (0.17 oz · inch) (no adjustment)

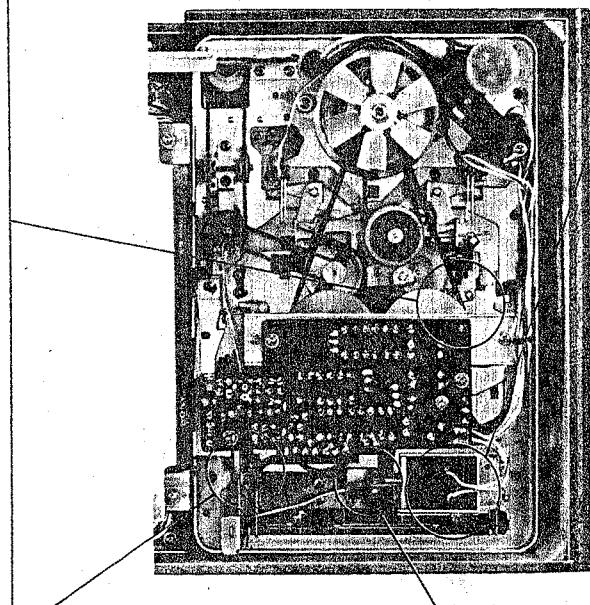
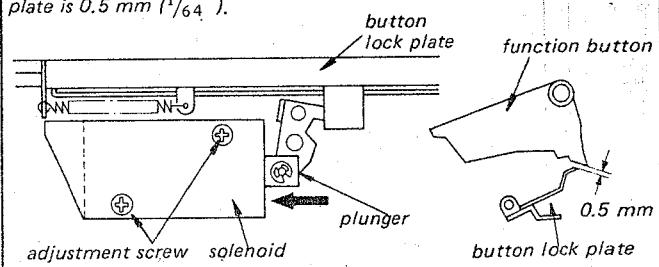


### PAUSE Switch (S12) Adjustment — STOP mode —



### Solenoid Adjustment — STOP mode —

With plunger pushed in arrow direction, and individual function button pushed, loosen adjusting screws and position solenoid so that clearance between button and button lock plate is 0.5 mm (1/64").

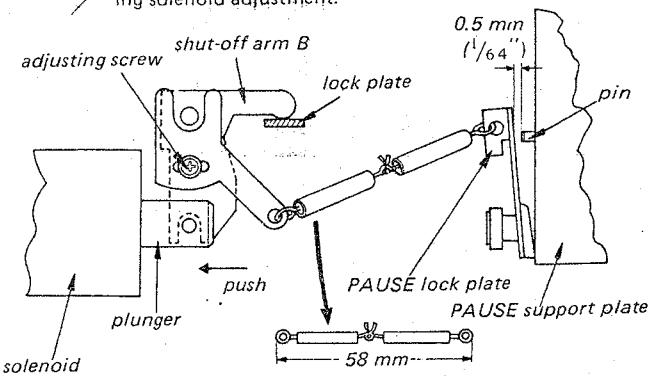


### PAUSE Release Adjustment — STOP mode —

Push plunger in arrow direction until shut-off arm B contacts lock plate. At the same time, PAUSE lock plate should be 0.5 mm (1/64") from pin.

If necessary, adjust with adjusting screw.

Note: This adjustment should be made following solenoid adjustment.



**CHECKS AFTER MECHANICAL ADJUSTMENTS**

1. After mechanical adjustments, perform the following operation checks with a cassette loaded.

Mode	Depress	Remarks
playback mode	fast forward button rewind button PAUSE button stop button	possible
	RECORD button EJECT button	impossible
fast forward mode	stop button rewind button PAUSE button	possible
	forward button EJECT button RECORD button	impossible
rewind mode	stop button fast forward button PAUSE button	possible
	forward button EJECT button RECORD button	impossible
record mode	forward button STOP button PAUSE button	possible
	fast forward button rewind button EJECT button	impossible
record forward mode	STOP button PAUSE button	possible
	fast forward button rewind button EJECT button	impossible

2. Function Time of Auto Shut-off Mechanism.

This mechanism should stop tape motion within 1 ~ 4 seconds at tape end in playback, RECORD, fast forward and rewind modes.

3. Clean the following parts with an alcohol moistened swab.

belts, idlers, tires of reel spindles, pinch roller, capstan

### 3-3. ELECTRICAL ADJUSTMENTS AND MEASUREMENTS

#### Precaution:

1. Clean the following parts with an alcohol moistened swab:
 

record/playback head	pinch roller
erase head	rubber belts
capstan	idle
2. Demagnetize record/playback head with a head demagnetizer.
3. Do not use magnetized screwdriver for adjustments.
4. After adjustments, apply locking paint to the adjusted parts.
5. Adjustments should be performed in the order given in this service manual.
6. Adjustments and measurements should be performed for both L-CH and R-CH with rated power supply voltage unless otherwise specified.
7. Record and playback level adjustments should be carefully made. The levels must be as specified for correct DOLBY circuit operation.

#### Test Equipment/Tools Required:

audio oscillator (af osc)  
 VTVM  
 1-kHz bandpass filter  
 attenuator ( $600\ \Omega$ )  
 non-magnetic screwdriver  
 wow meter  
 distortion meter  
 blank tape (completely erased with bulk eraser)  
 resistors ....  $600\ \Omega$  ( $\frac{1}{4}\ W$ ),  $300\ \Omega$  ( $\frac{1}{4}\ W$ )  
                      $10\ k\Omega$  ( $\frac{1}{4}\ W$ ),  $100\ k\Omega$  ( $\frac{1}{4}\ W$ )  
 SONY test tapes  
     P-4-L81 (333 Hz, 0 dB)  
     P-4-A82 (10 kHz, -10 dB)  
     WS-48 (3 kHz, 0 dB)

#### Normal Input Level

	MIC	LINE IN
impedance input level	$300\ \Omega$ -60 dB (0.78 mV)	$10\ k\Omega$ -10 dB (0.25 V)

#### Normal Output Level

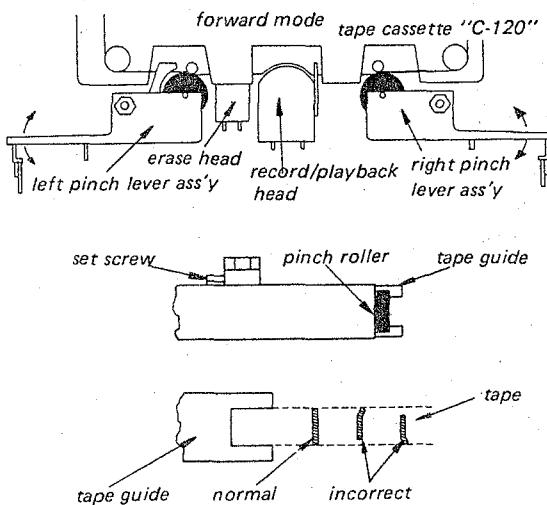
	LINE OUT
load impedance output level	$100\ k\Omega$ 0 dB (0.78 V)

Bias voltage across heads is as follows:

(VTVM reading)

erase head ..... more than 37 dB (55 V)  
 record/playback head .....  $26 \sim 28.5$  dB (15 ~ 20 V)

#### 1. Tape Path Adjustment



This adjustment is required when replacing pinch lever assembly.

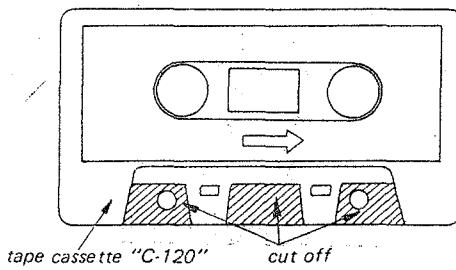
#### Procedure:

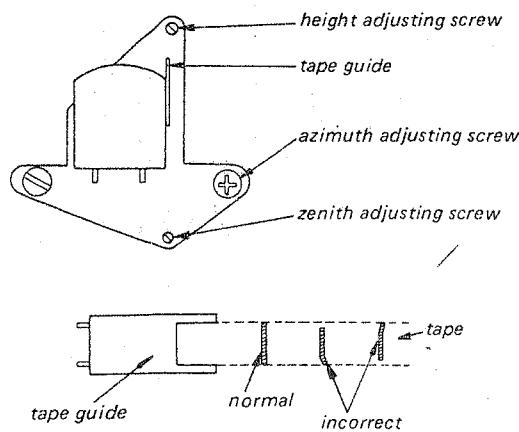
1. Place the unit in forward mode with the alignment tape cassette (shown below) inserted.
2. Repeat forward and PAUSE modes several times by depressing and releasing PAUSE button, watching tape passing through the tape guide.
3. If necessary, adjust tape guide height by set screw.

**Note:** Do not remove two pinch lever assemblies and record playback head at a time.

#### How to make alignment tape cassette.

Cut both sides of the cassette as shown below.



**2. Head Height Adjustment**

This adjustment should be performed when replacing tape path parts and before azimuth adjustment.

**Procedure:**

1. Push forward button slowly, with the alignment tape cassette (see page 19) inserted.
2. If the tape is curled on the tape guide, adjust by height adjusting screw.

**Note:** Zenith adjusting screw should be turned in the same direction and by the same degrees as the height adjusting screw.

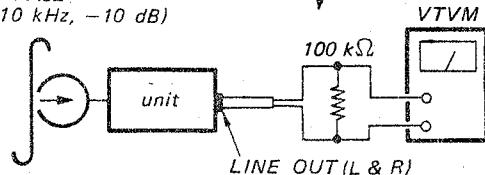
**3. Head Azimuth Adjustment****Control/Switch Setting:**

LIMITER switch:	OFF
TAPE SELECT switch:	NORMAL
DOLBY switch:	OFF

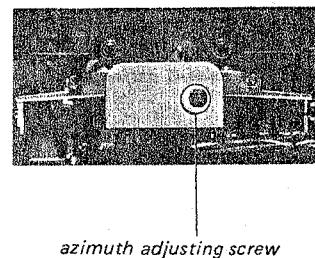
**Procedure:**

1. Mode: playback

P-4-A82  
(10 kHz, -10 dB)



Adjust azimuth adjusting screw for maximum VTVM readings for both L and R channels. If the readings don't coincide, set the screw midway between the two screw positions.



*azimuth adjusting screw*

#### 4. Playback Level Adjustment

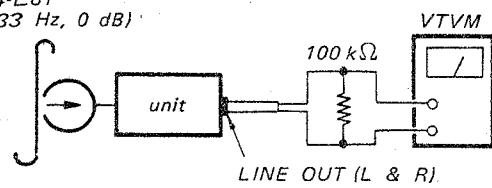
##### Control/Switch Setting:

LIMITER switch: OFF  
 TAPE SELECT switch: NORMAL  
 DOLBY switch: OFF

##### Procedure:

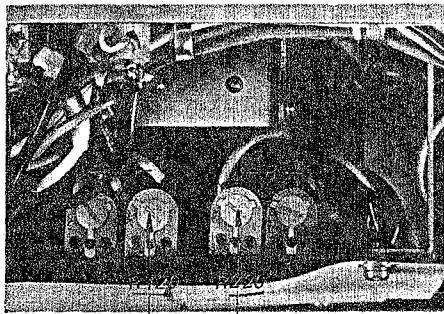
1. Mode: playback

P-4-L81  
 (333 Hz, 0 dB)



2.

Adjust	VTVM reading	Remarks
R120 (L)	0 dB	1. Allowance: within $\pm 0.5$ dB
R220 (R)	(0.78 V)	2. Level difference between L-CH and R-CH should be within 1 dB.



10 kΩ (B), adjustable

#### 5. Playback Equalizer Adjustment

##### Control/Switch Setting:

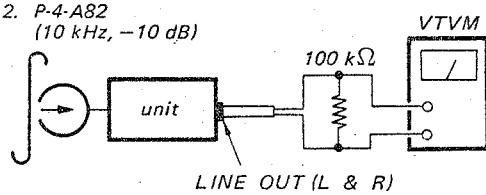
LIMITER switch: OFF  
 TAPE SELECT switch: NORMAL  
 DOLBY switch: OFF

##### Procedure:

1. Mode: playback

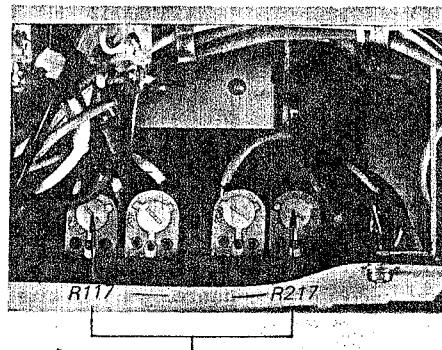
1. P-4-L81  
 (333 Hz, 0 dB)

2. P-4-A82  
 (10 kHz, -10 dB)



Adjust R117 (L) and R217 (R) so that VTVM readings of P-4-A82 are lower by 11.5 dB than the P-4-L81 readings.

2. Perform this adjustment and playback level adjustment alternately until the satisfactory result is obtained for both adjustments.



5 kΩ (B), adjustable

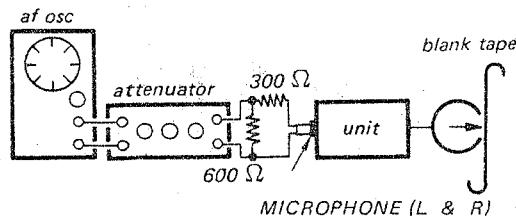
## 6. Recording Bias Adjustment

### Control/Switch Setting:

LIMITER switch: OFF  
 TAPE SELECT switch: NORMAL  
 DOLBY switch: OFF  
 RECORD VOLUME control: For 0 dB (0.78 V) LINE OUT level when supplying a 333 Hz, -60 dB (0.78 mV) signal to MICROPHONE jack.

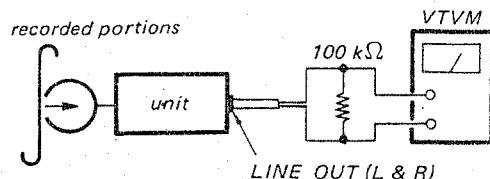
### Procedure:

1. Mode: record



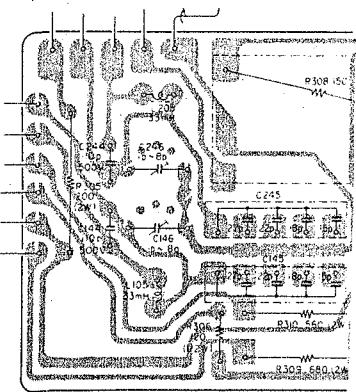
1. 1 kHz, -90 dB (24 µV)
2. 10 kHz, -90 dB (24 µV)

2. Mode: playback



Repeat steps 1 and 2 changing C145 (L) and C245 (R) connections so that playback output levels of 1 kHz and 10 kHz signals are the same. (Allowance: 0 ~ -1 dB) When 10 kHz output level exceeds 1 kHz output level, increase capacitance. When 1 kHz output level exceeds 10 kHz output level, decrease capacitance.

3. If necessary, adjust by trimmer capacitors C146 (L) and C246 (R).



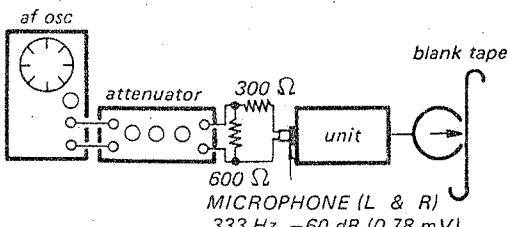
## 7. Record Level Adjustment

### Control/Switch Setting:

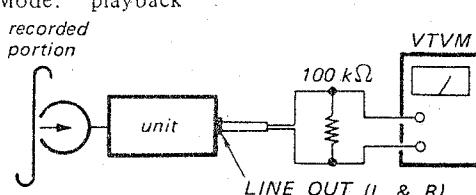
LIMITER switch: OFF  
 TAPE SELECT switch: NORMAL  
 DOLBY switch: OFF  
 RECORD VOLUME control: For 0 dB (0.78 V) LINE OUT level when supplying a 333 Hz, -60 dB (0.78 mV) signal to MICROPHONE jack.

### Procedure:

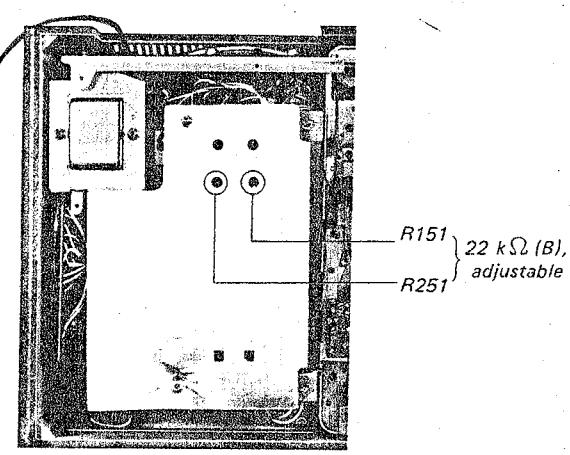
1. Mode: record



2. Mode: playback



3. Repeat steps 1 and 2 adjusting R151 (L) and R251 (R) so that playback outputs are 0 dB (0.78 V) on VTVM. Allowance: 0.5 ~ -0.5 dB (0.82 ~ 0.72 V)



## 8. LEVEL Meter Calibration

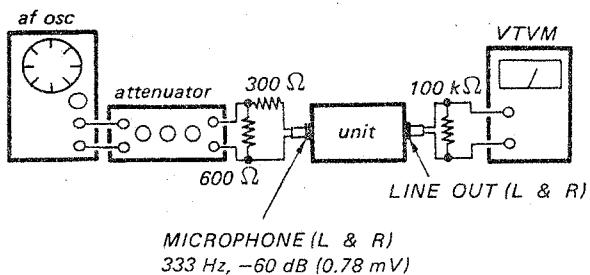
### Control/Switch Setting:

LIMITER switch: OFF  
 TAPE SELECT switch: NORMAL  
 DOLBY switch: OFF  
 RECORD VOLUME

control: For 0 dB (0.78 V) LINE OUT level when supplying a 333 Hz, -60 dB (0.78 mV) signal to MICROPHONE jack.

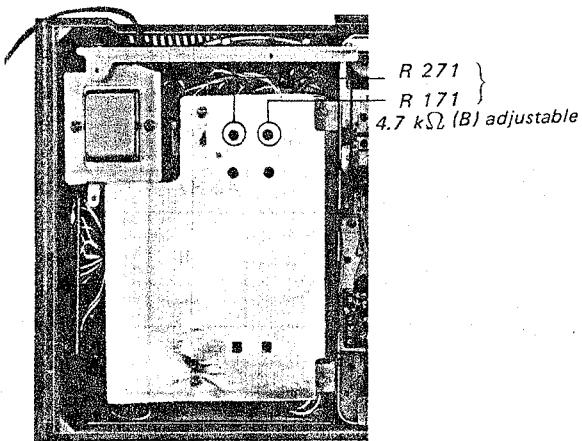
### Procedure:

1. Mode: record



2.

Adjust	LEVEL meter reading
R171 (L) R271 (R)	



## 9. Playback Signal-to-Noise Ratio Measurement

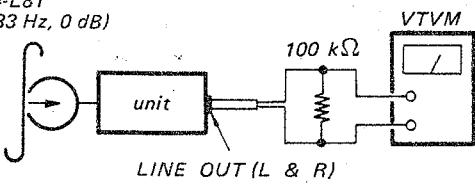
### Control/Switch Setting:

LIMITER switch: OFF  
 TAPE SELECT switch: NORMAL  
 DOLBY switch: OFF

### Procedure:

1. Mode: playback

P-4-L81  
(333 Hz, 0 dB)



2. Memorize the VTVM reading.

3. Push PAUSE button and observe VTVM.

### Specification:

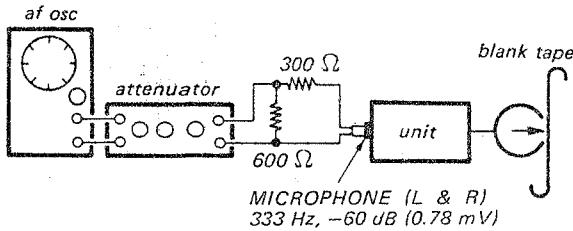
Level Difference between Step 2 and Step 3:  
greater than 49 dB.

## 10. Overall Signal-to-noise Ratio Measurement

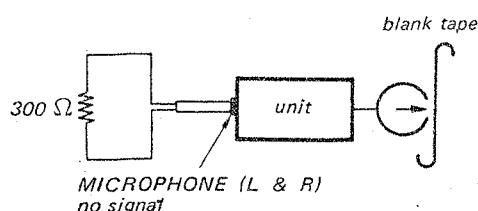
## Control/Switch Setting:

LIMITER switch: OFF  
 TAPE SELECT switch: NORMAL  
 DOLBY switch: OFF  
 RECORD VOLUME control:  
 For 0 dB (0.78 V) LINE OUT level when supplying a 333 Hz, -60 dB (0.78 mV) signal to MICROPHONE jack.

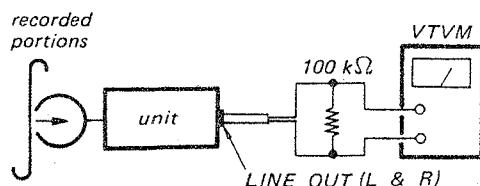
## 1. Mode: record



## 2. Mode: record



## 3. Mode: playback



Playback	Level Difference
333 Hz	greater than 46 dB
no signal	

4. Measure S/N ratio for 1 kHz and 10 kHz signals according to Steps 1 to 3.

5. With DOLBY switch set to ON position, perform Step 4.

6. Ensure that DOLBY system improves S/N ratio.

## Specification:

4 dB or more at 1 kHz  
 8 dB or more at 10 kHz

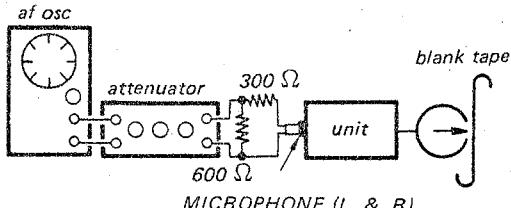
## 11. Overall Frequency Response Measurement

## Control/Switch Setting:

LIMITER switch: OFF  
 TAPE SELECT switch: NORMAL  
 RECORD VOLUME control:  
 For 0 dB (0.78 V) LINE OUT level when supplying a 333 Hz, -60 dB (0.78 mV) signal to MICROPHONE jack.

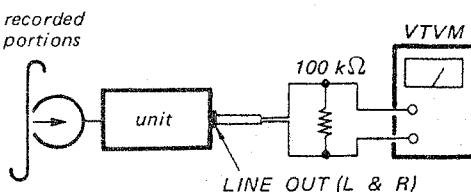
## Procedure:

## 1. Mode: record



1. 40 Hz, -80 dB (78 µV)
2. 1 kHz, -80 dB (78 µV)
3. 7 kHz, -80 dB (78 µV)
4. 10 kHz, -80 dB (78 µV)
5. 12.5 kHz, -80 dB (78 µV)

## 2. Mode: playback



## 3. Output Level Difference from 1 kHz output level:

DOLBY switch: ON

Tape	40 Hz	10 kHz
C-120	+4 dB	±4 dB
Chromium Dioxide	-2 dB	
CRO-60		

DOLBY switch: OFF

Tape	40 Hz	7 kHz	12.5 kHz
C-120	+0 dB	+2 dB	+2 dB
Chromium Dioxide	-6 dB	±3 dB	±4 dB
CRO-60			

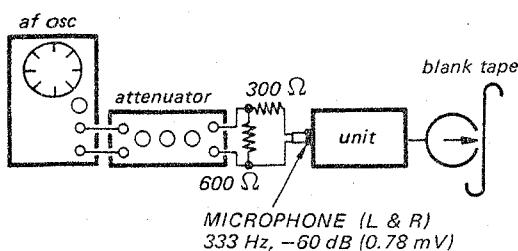
## 12. Overall Distortion Measurement

### Control/Switch Setting:

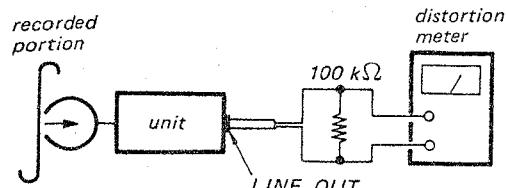
LIMITER switch: OFF  
 TAPE SELECT switch: NORMAL  
 DOLBY switch: OFF  
 RECORD VOLUME control: For 0 dB (0.78 V) LINE OUT level when supplying a 333 Hz, -60 dB (0.78 mV) signal to MICROPHONE jack.

### Procedure:

1. Mode: record



2. Mode: playback



Specification: less than 2 %

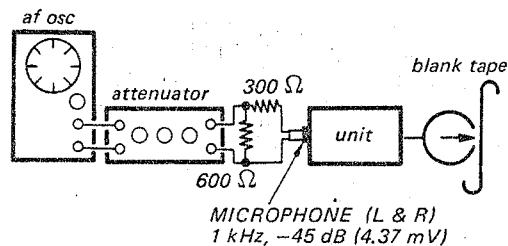
## 13. Erase Ratio Measurement

### Control/Switch Setting:

LIMITER switch: OFF  
 TAPE SELECT switch: NORMAL  
 DOLBY switch: OFF  
 RECORD VOLUME control: For 0 dB (0.78 V) LINE OUT level when supplying a 333 Hz, -60 dB (0.78 mV) signal to MICROPHONE jack.

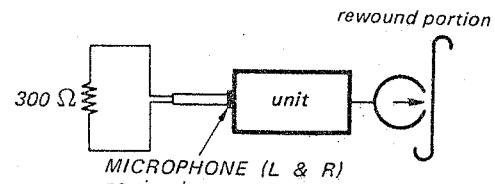
### Procedure:

1. Mode: record

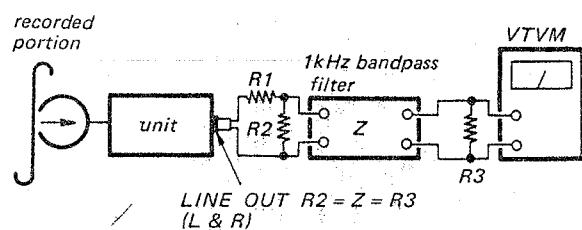


2. Rewind half of the recorded portion.

3. Mode: record



4. Mode: playback



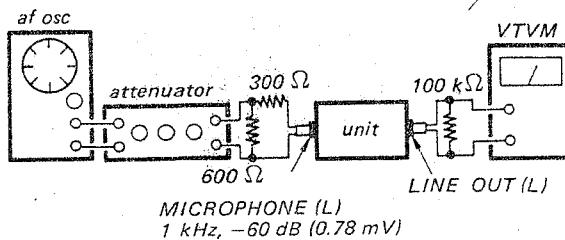
Recorded Signal	Level Difference
1 kHz	
no signal	greater than 60 dB

**14. Channel Balance Check****Control/Switch Setting:**

LIMITER switch: OFF  
 TAPE SELECT switch: NORMAL  
 DOLBY switch: OFF

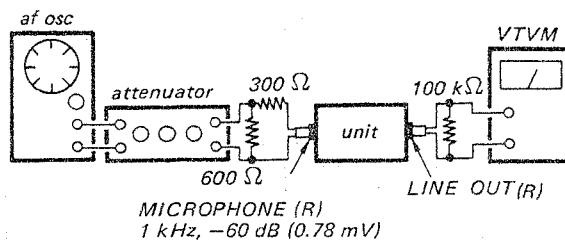
**Procedure:**

1. Mode: record



Adjust L-CH RECORD VOLUME control for 0 dB (0.78 V) LINE OUT level.

2. Mode: record



Adjust R-CH RECORD VOLUME control at the same position as L-CH, and observe VTVM reading.

**Specification:**  $-3 \sim 3$  dB (0.55 ~ 1.1 V)

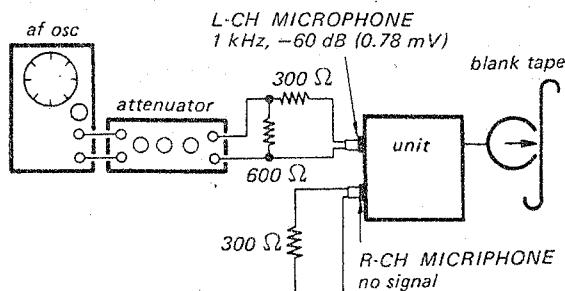
**15. Cross-talk Measurement  
(between L and R channels)****Control/Switch Setting:**

LIMITER switch: OFF  
 TAPE SELECT switch: NORMAL  
 DOLBY switch: OFF  
 RECORD VOLUME control:

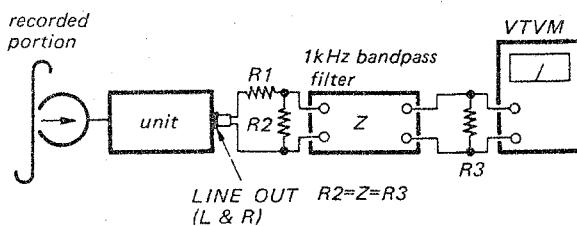
For 0 dB (0.78 V) LINE OUT level when supplying a 333 Hz, -60 dB (0.78 mV) signal to MICROPHONE jack.

**Procedure:**

1. Mode: record



2. Mode Playback



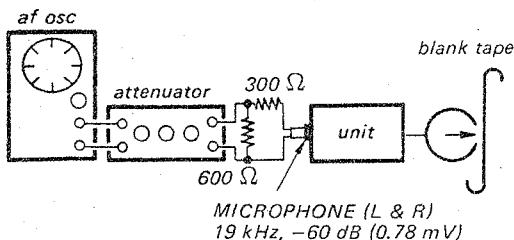
Play back	Level Difference
L-CH (1 kHz)	greater than 30 dB
R-CH (no signal)	

**16. 19 kHz Filter Check****Control/Switch Setting:**

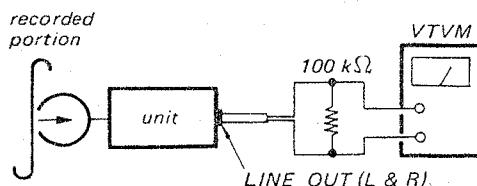
LIMITER switch: OFF  
 TAPE SELECT switch: NORMAL  
 DOLBY switch: OFF  
 RECORD VOLUME control: For 0 dB (0.78 V) LINE OUT level when supplying a 333 Hz, -60 dB (0.78 mV) signal to MICROPHONE jack.

**Procedure:**

1. Mode: record



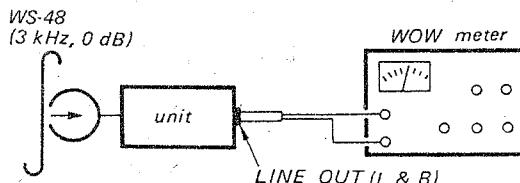
2. Mode: playback

**Specification:**

VTVM reading: less than -28 dB  
 (30.8 mV)

**17. Wow and Flutter Measurement****Control/Switch Setting:**

LIMITER switch: OFF  
 TAPE SELECT switch: NORMAL  
 DOLBY switch: OFF

**Procedure:****Specification: 0.2 % (RMS)**

Note: Measure wow and flutter at beginning, midway and end portion of tape (WS-48).

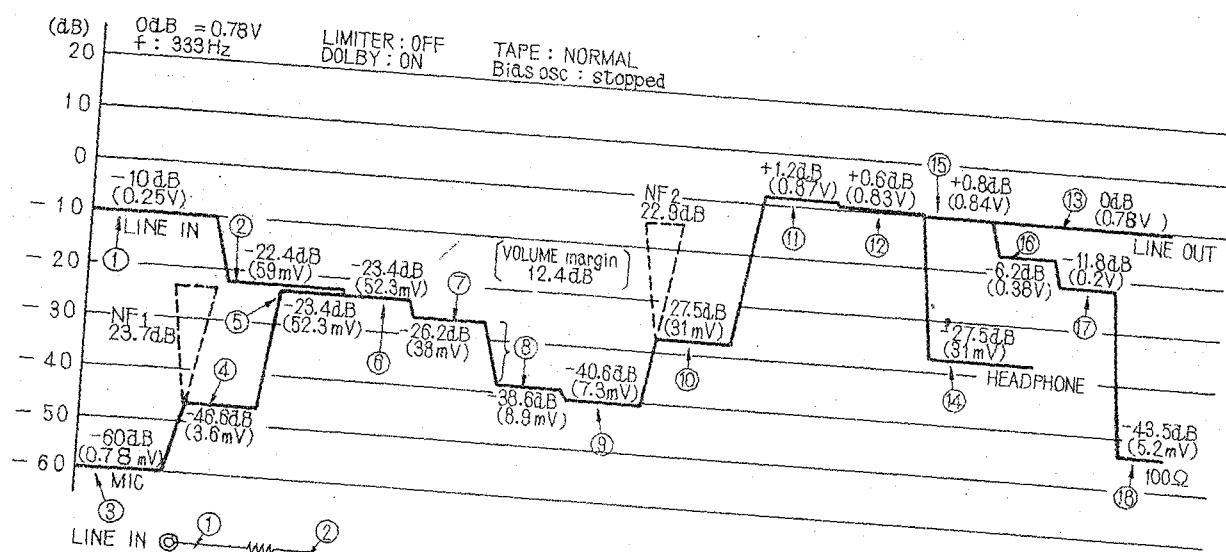
-161SD

## SECTION 4

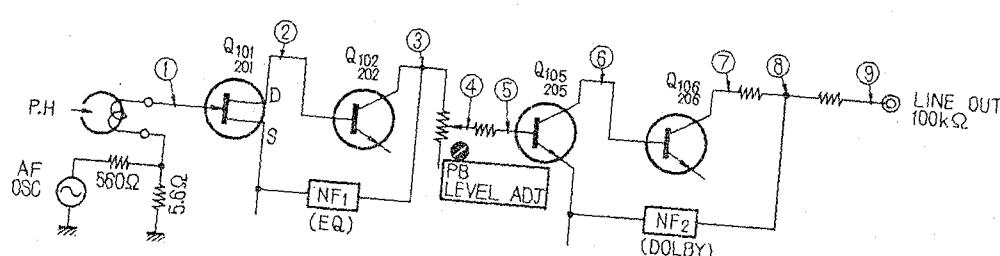
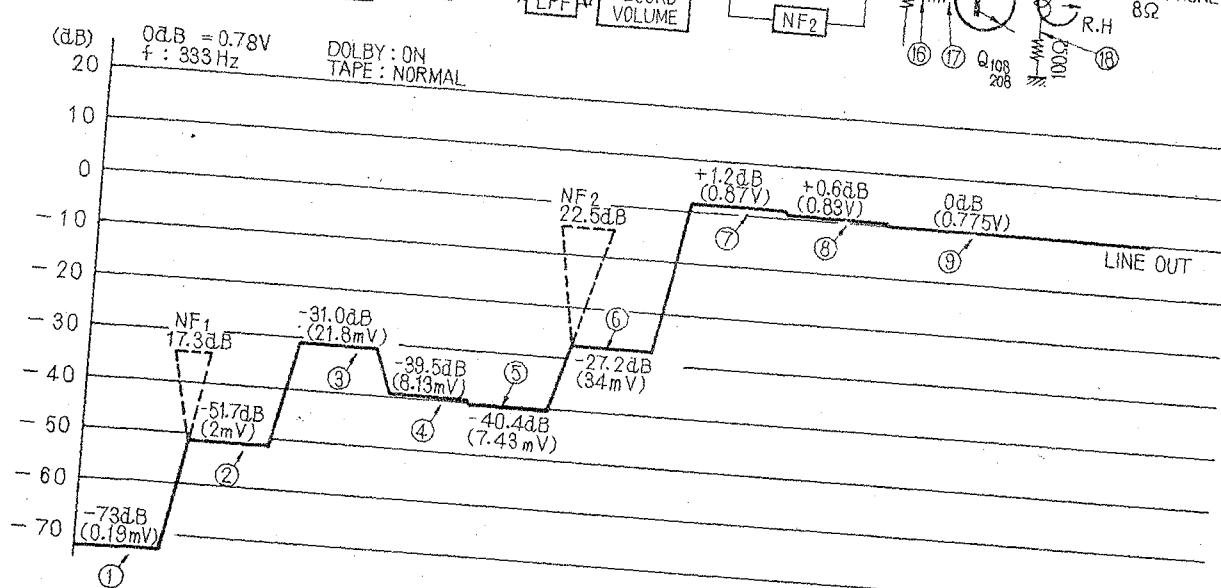
### DIAGRAMS

#### 4-1. LEVEL DIAGRAMS

Playback Mode



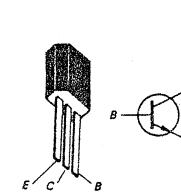
Record Mode



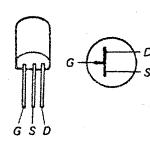
# TC-161SD TC-161SD

## TRANSISTORS AND DIODES

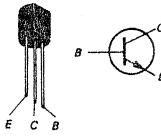
Q102, 202 } 2SC631A  
 Q103, 203 }  
 Q105, 205 } 2SC632A  
 Q503, 603 }  
 Q104, 204 } 2SC633A  
 Q107, 207 }  
 Q108, 208 } 2SC634A  
 Q301, 302 }  
 Q401, 402 }  
 Q403, 404 }  
 Q405 }  
 Q106, 206 } 2SC634A  
 Q109, 209 }  
 Q501, 502 }  
 Q504, 505 }  
 Q506, 507 }  
 Q601, 602 }  
 Q604, 605 }  
 Q606, 607 }



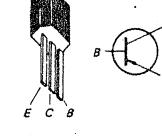
Q101 } 2SK43  
Q201 }



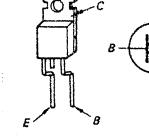
Q303: 2SC1384



Q304: 2SA678

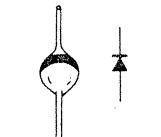


Q406: 2SD343

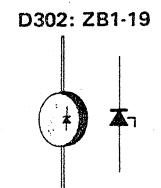


D102, 202 } 1T-40  
 D402, 403 }  
 D103, 203 }  
 D405, 501 } 1T-22  
 D502, 601 }  
 D602 }  
 D503, 603 } 1S1555  
 D504, 604 }

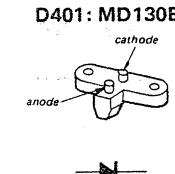
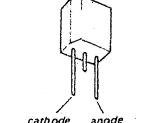
D101 } VO-6C  
D201 }



D303, 304 } 10D-2  
 D305, 306 }  
 D406, 407 }  
 D408, 409 }  
 D410 }

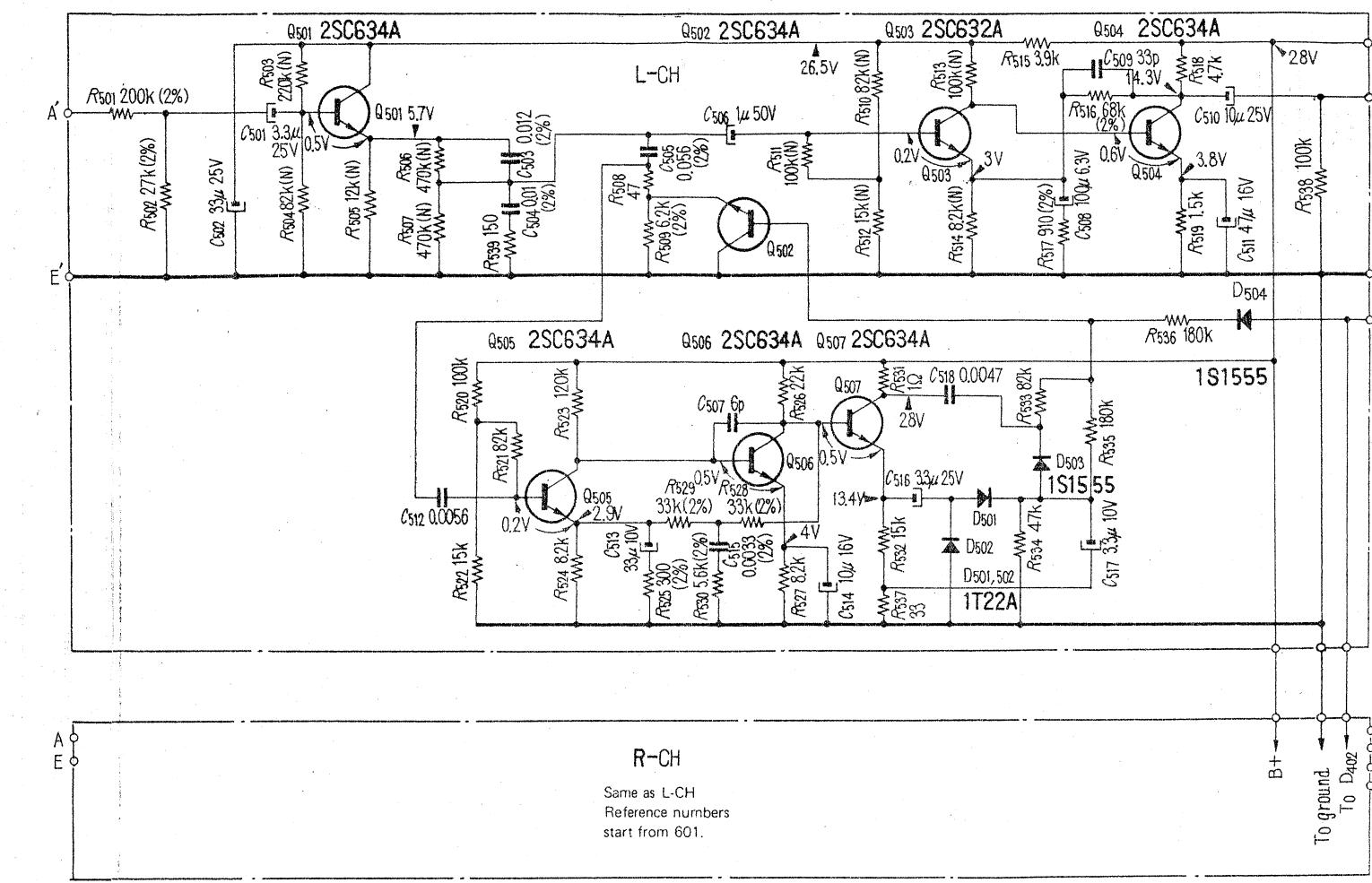


D301 } MZ-08  
D404 }



## 4-2. SCHEMATIC DIAGRAMS

### DOLBY Circuit



R-CH

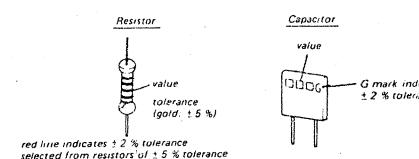
Same as L-CH  
Reference numbers  
start from 601.

- Note:
- All resistors and capacitors are rated in  $\Omega$  and  $\mu\text{F}$  unless otherwise indicated.
  - indicates ground to chassis.
  - The letter (N) which is suffixed to rating values shows a low-noise resistor.
  - Voltage values shown are measured with a voltmeter (20 k $\Omega$ /V) in playback mode.

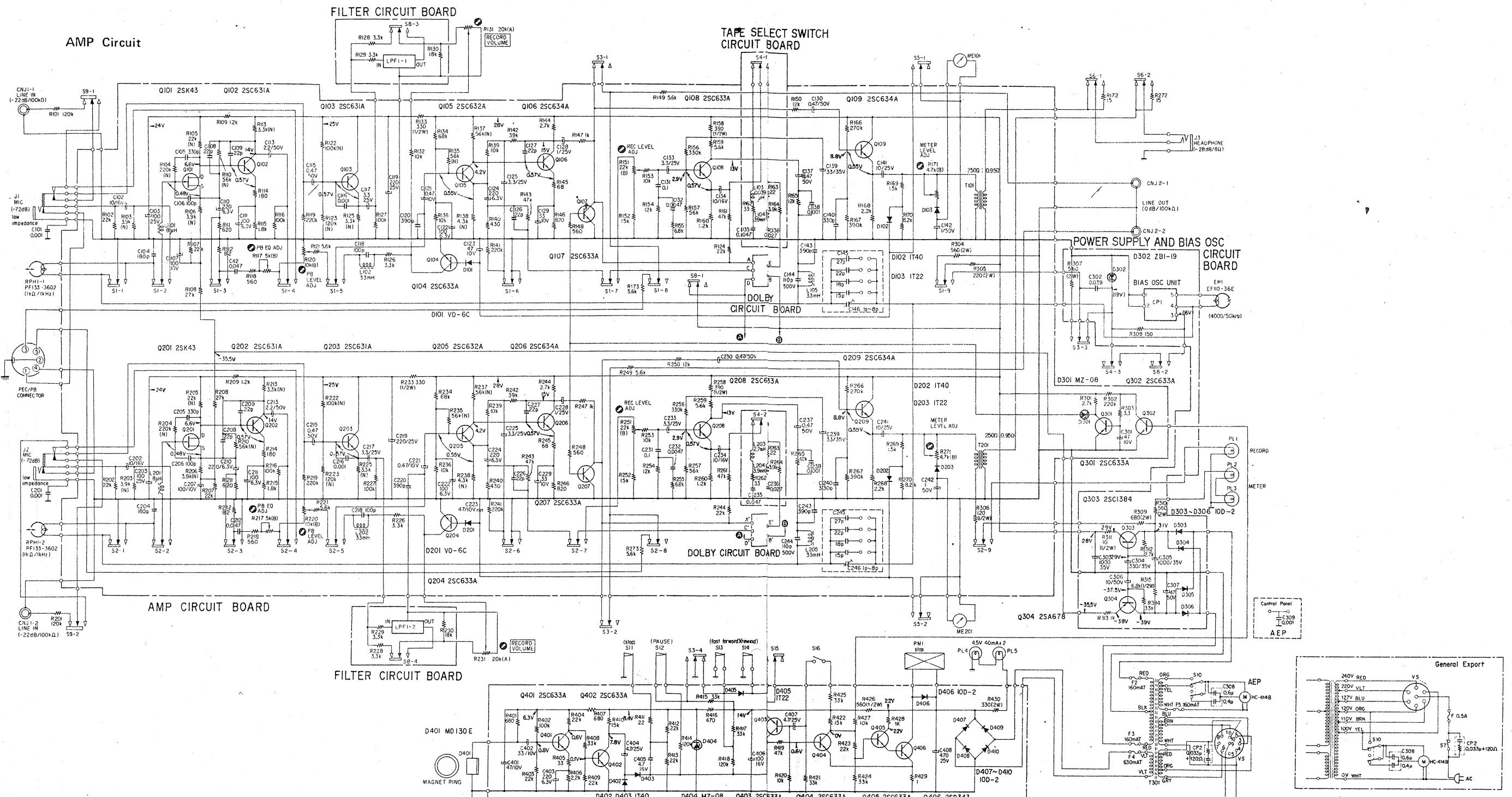
- Variations may be noted because of normal production tolerances.
- adjustable
  - Components for R-CH are the same value as for L-CH.

When replacing resistors and capacitors needing  $\pm 2\%$  tolerance, use only those with red line or G mark, as DOLBY system requires precise circuit operation.

#### 2% Tolerance Identification

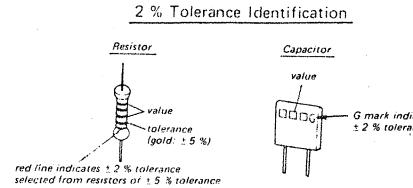


# TC-161SD TC-161SD


**Note:**

- All resistors and capacitors are rated in  $\Omega$  and  $\mu F$  unless otherwise indicated.
- $\text{---}$  indicates ground to chassis.
- The letter (N) which is suffixed to rating values shows a low-noise resistor.
- Voltage values shown are measured with a voltmeter ( $20 \text{ k}\Omega/\text{V}$ ) in playback mode. Variations may be noted because of normal production tolerances.
- Voltage values for L-CH is the same as for R-CH.

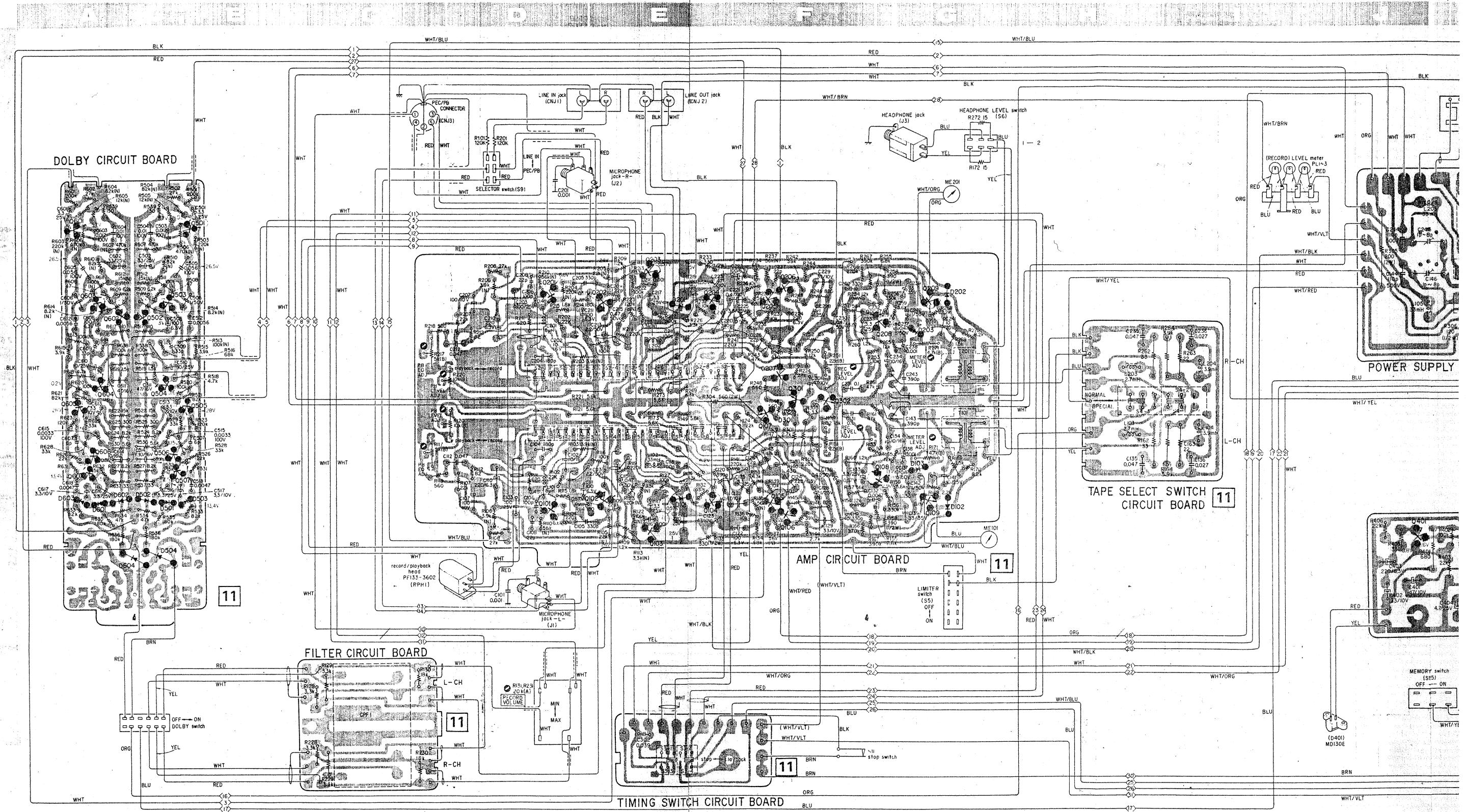
6. When replacing resistors and capacitors specified with 2% tolerance, use the specified ones, since DOLBY system requires precise circuit operation

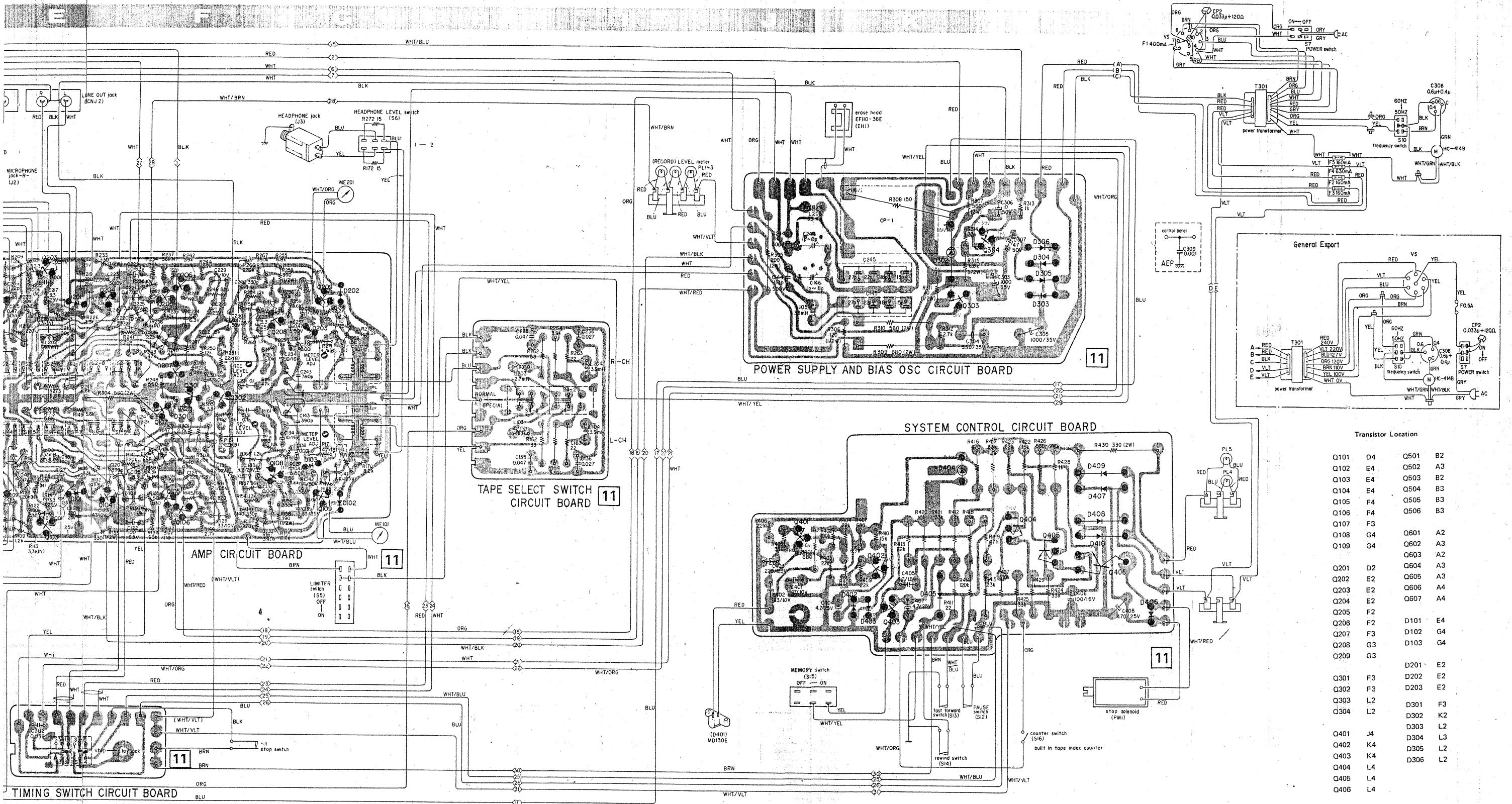

**7. Switch mode.**

Ref. No.	Switch	Mode
S1-1 ~ 9	record/playback	playback
S2-1 ~ 9	record/playback	playback
S3-1 ~ 4	timing	playback
S4-1, 2	TAPE SELECT	NORMAL
S5-1, 2	LIMITER	ON
S6-1, 2	HEADPHONE LEVEL	1
S7	POWER	ON
S8-1 ~ 4	DOLBY	OFF
S9	.....	.....
S10	.....	.....

Ref. No.	Switch	Mode
S11	STOP	OFF
S12	PAUSE	OFF
S13	fast forward	OFF
S14	rewind	OFF
S15	MEMORY	OFF
S16	COUNTER	OFF

### 3-3. MOUNTING DIAGRAMS



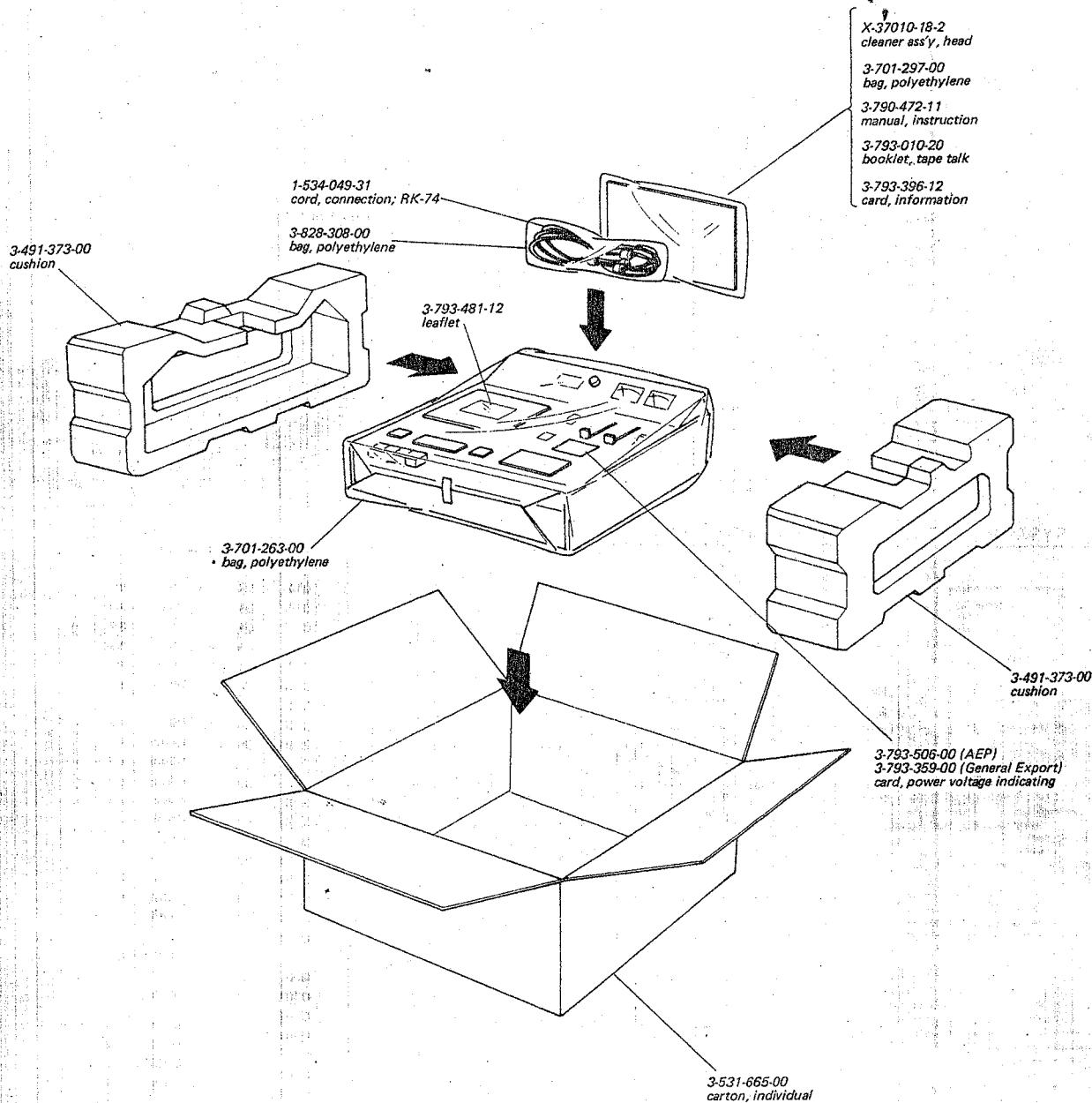


## SECTION 5

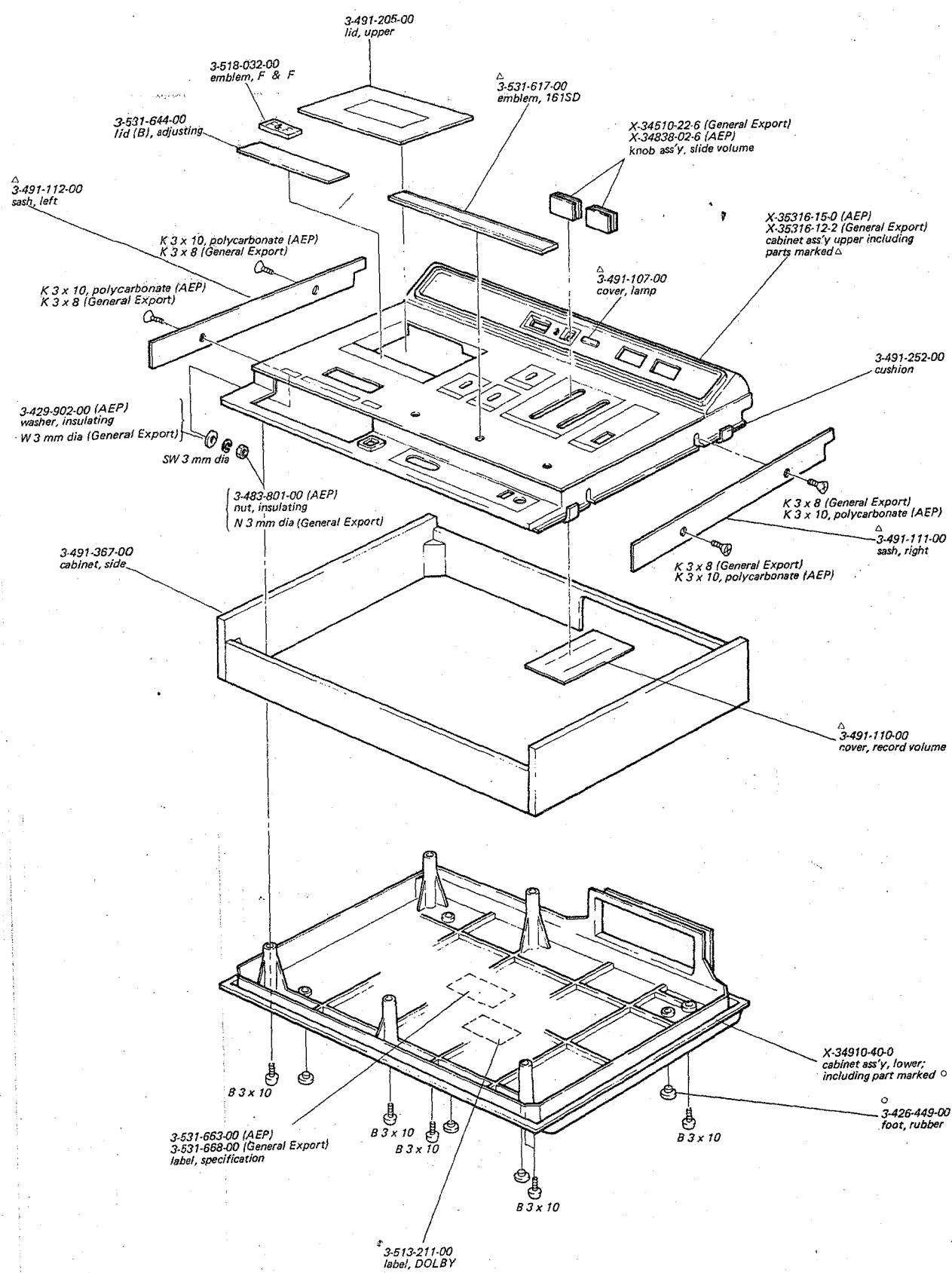
### EXPLODED VIEWS

Parts without part numbers are not available.  
All screws are Phillips type (cross recess type) unless otherwise indicated.  
(-) :slotted head.

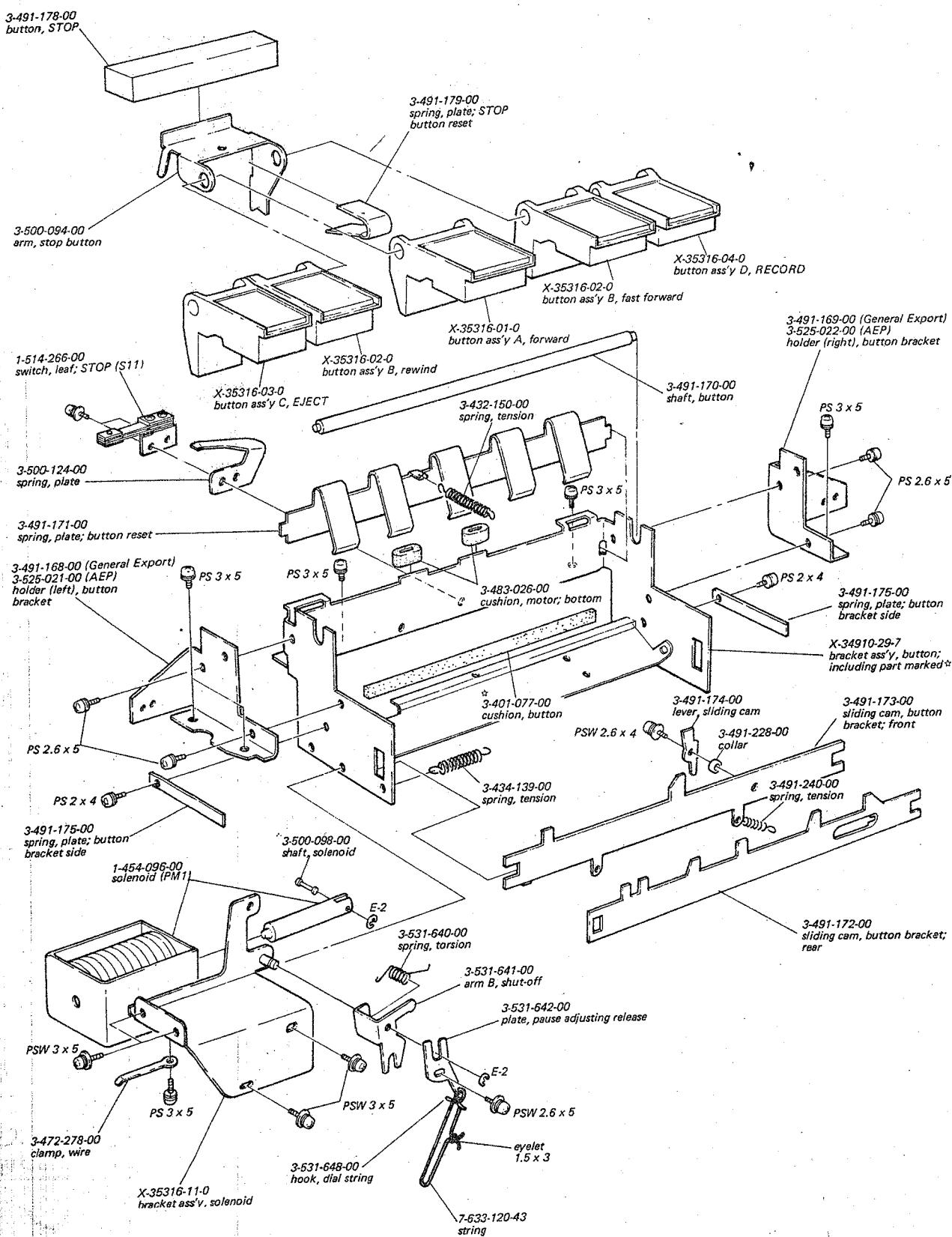
#### 5-1. PACKING



## 5-2. CABINET - Top View -

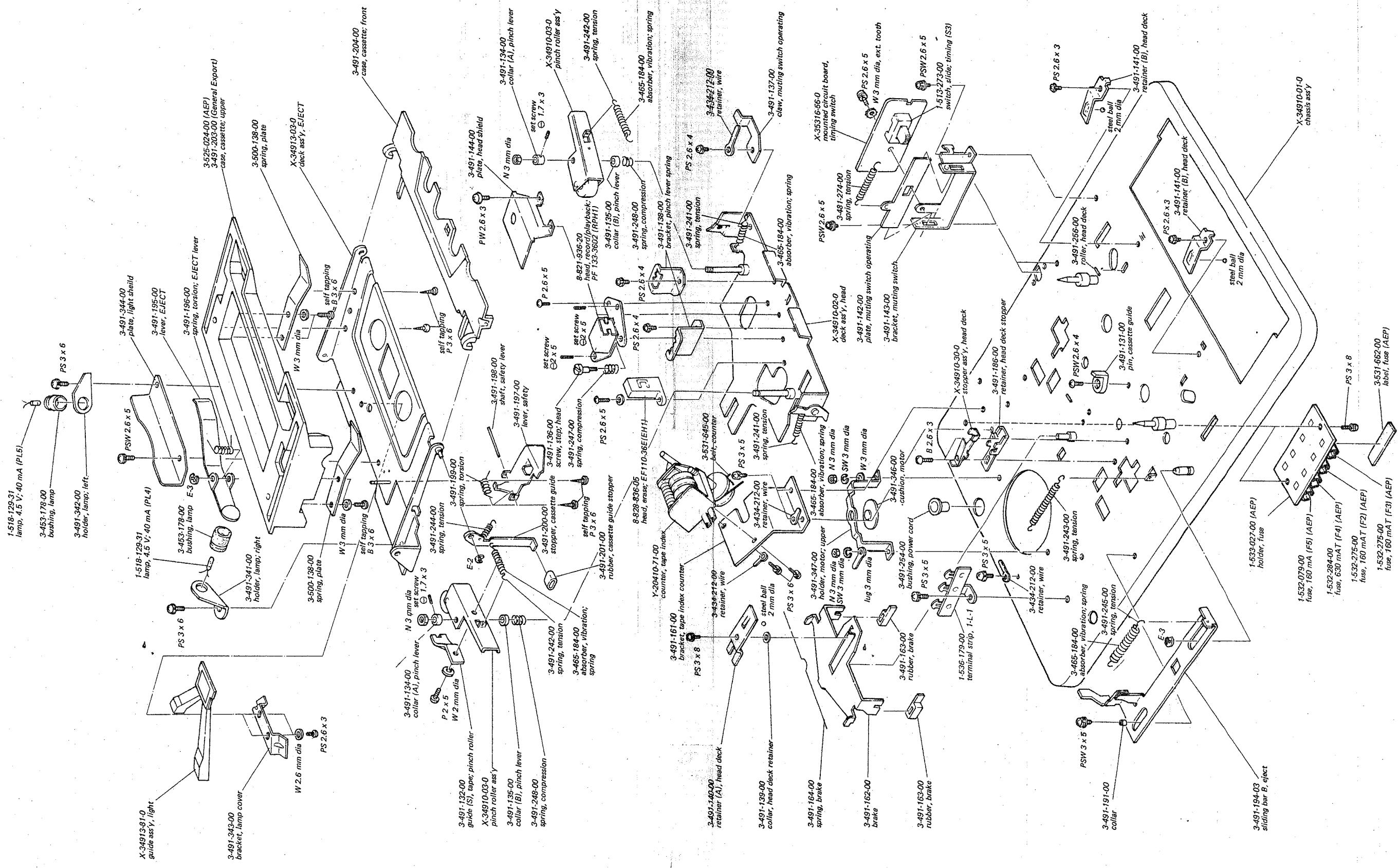


### **5-3. BUTTONS**



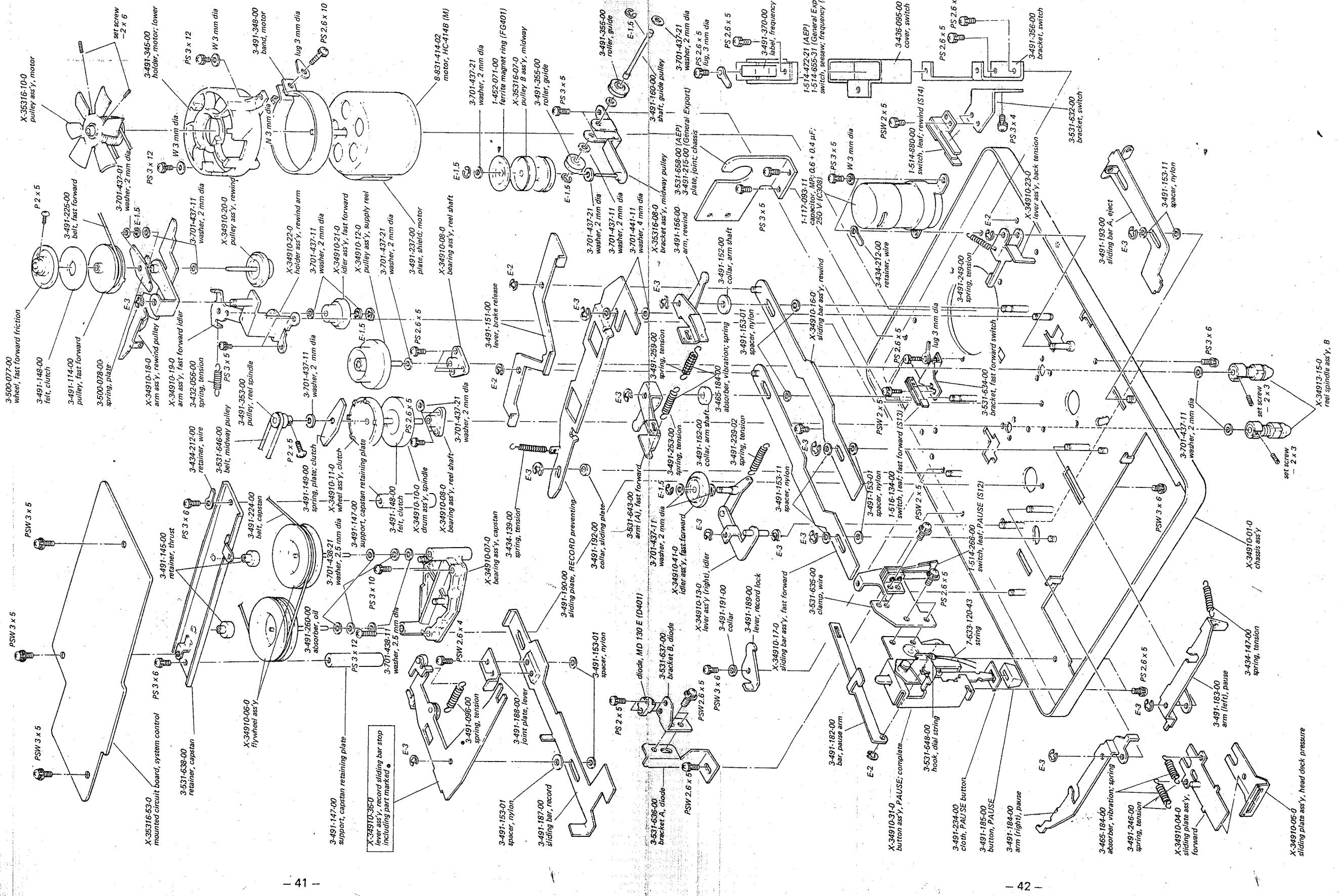
**TC-161SD**

**5-4. CHASSIS – Top View –**



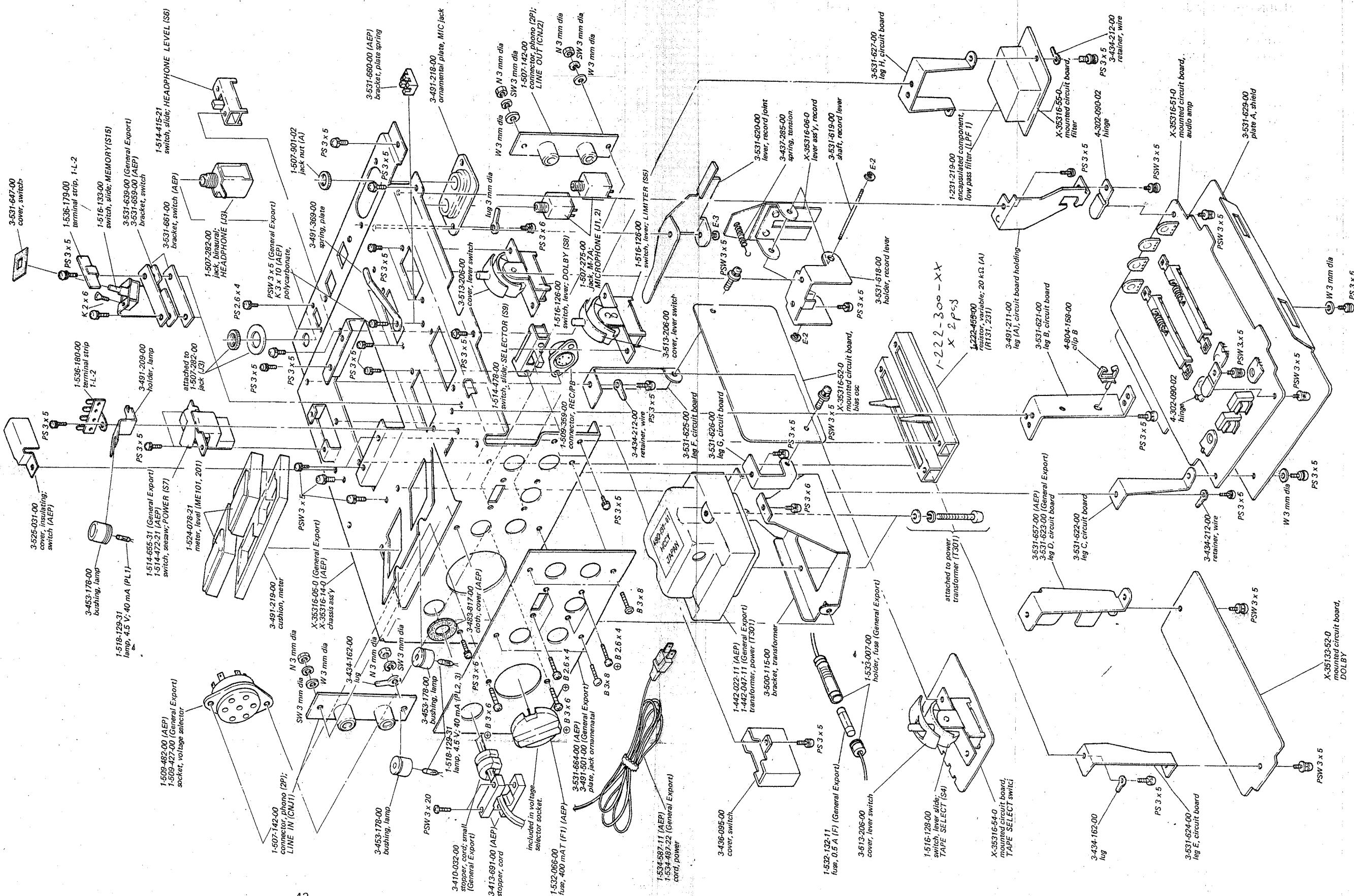
**TC-161SD**

## 5-5. CHASSIS - *Bottom View* -



**TC-161SD**

## 5-6. AMP CHASSIS



## SECTION 6

## ELECTRICAL PARTS LIST

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
<b>MOUNTED CIRCUIT BOARD</b>					
X-35316-51-0	audio amp		L101, 201	1-407-519-00	coil, inductor 8 $\mu$ H
X-35133-52-0	DOLBY		L102, 202	1-407-561-00	coil, micro inductor 33 mH
X-35316-52-0	bias osc		L103, 203	1-407-497-00	coil, micro inductor 2.7 mH
X-35316-53-0	system control		L104, 204	1-407-499-00	coil, micro inductor 3.9 mH
X-35316-54-0	TAPE SELECT switch		L105, 205	1-407-561-00	coil, micro inductor 33 mH
X-35316-55-0	filter		T101, 201	1-427-299-00	transformer, output
X-35316-56-0	timing switch		T301	{ 1-442-022-11	transformer, power (AEP)
<b>SEMICONDUCTORS</b>					
Q101, 201	FET	2SK 43			
Q102, 202	transistor	2SC631A	C101, 201	1-101-455-11	0.001 50 V ceramic
Q103, 203	transistor	2SC631A	C102, 202	1-121-651-11	10 16 V elect
Q104, 204	transistor	2SC633A	C103, 203	1-121-416-11	100 25 V elect
Q105, 205	transistor	2SC632A	C104, 204	1-107-091-11	180 p 50 V silvered mica
Q106, 206	transistor	2SC634A	C105, 205	1-107-143-11	330 p 50 V silvered mica
Q107, 207	transistor	2SC633A	C106, 206	1-107-085-11	100 p 50 V silvered mica
Q108, 208	transistor	2SC633A	C107, 207	1-121-491-11	100 10 V elect
Q109, 209	transistor	2SC634A	C108, 208	1-107-115-11	22 p 50 V silvered mica
Q301, 302	transistor	2SC633A	C109, 209	1-107-115-11	22 p 50 V silvered mica
Q303	transistor	2SC1384	C110, 210	1-121-419-11	220 6.3 V elect
Q304	transistor	2SA678	C111, 211	1-121-413-11	100 6.3 V elect
Q401, 402	transistor	2SC633A	C112, 212	1-105-521-12	0.047 50 V mylar
Q403, 404	transistor	2SC633A	C113, 213	1-121-450-11	2.2 50 V elect
Q405	transistor	2SC633A	C114		
Q406	transistor	2SD343	C115, 215	1-121-726-11	0.47 50 V elect
Q501, 601	transistor	2SC634A	C116, 216	1-105-661-12	0.001 50 V mylar
Q502, 602	transistor	2SC634A	C117, 217	1-121-392-11	3.3 25 V elect
Q503, 603	transistor	2SC632A	C118, 218	1-105-085-11	100 p 50 V silvered mica
Q504, 604	transistor	2SC634A	C119, 219	1-121-422-11	220 25 V elect
Q505, 605	transistor	2SC634A	C120, 220	1-102-113-11	390 p 50 V ceramic
Q506, 606	transistor	2SC634A	C121, 221	1-127-048-11	0.47 10 V solid aluminum elect
Q507, 607	transistor	2SC634A	C122, 222	1-121-413-11	100 6.3 V elect
D101, 201	diode	VO-6C	C123, 223	1-121-352-11	47 10 V elect
D102, 202	diode	1T-40	C124, 224	1-121-419-11	220 6.3 V elect
D103, 203	diode	1T-22	C125, 225	1-121-392-11	3.3 25 V elect
D301	diode	MZ-08	C126, 226	1-107-115-11	22 p 50 V silvered mica
D302	diode	ZB1-19	C127, 227	1-107-115-11	22 p 50 V silvered mica
D303, 304	diode	10D-2	C128, 228	1-121-390-11	1 25 V elect
D305, 306	diode	10D-2	C129, 229	1-121-402-11	33 10 V elect
D401	diode	MD130E	C130, 230	1-121-726-11	0.47 50 V elect
D402, 403	diode	1T-40	C131, 231	1-105-685-12	0.1 50 V mylar
D404	diode	MZ-08	C132, 232	1-105-669-12	0.0047 50 V mylar
D405	diode	1T-22	C133, 233	1-121-392-11	3.3 25 V elect
D406, 407	diode	10D-2	C134, 234	1-121-651-11	10 16 V elect
D408, 409	diode	10D-2	C135, 235	1-108-509-11	0.047 50 V mylar
D410	diode	10D-2	C136, 236	1-108-506-11	0.027 50 V mylar
D501, 601	diode	1T-22	C137, 237	1-121-726-11	0.47 50 V elect
D502, 602	diode	1T-22	C138, 238	1-105-661-12	0.001 50 V mylar
D503, 603	diode	1S1555			
D504, 604	diode	1S1555			

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>				<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>				
C139, 239	1-121-652-11	33	3.5 V	elect		R104, 204	1-242-729-09	220 k (N)				
C140, 240	1-102-112-11	330 p	50 V	ceramic		R105, 205	1-242-705-09	22 k (N)				
C141, 241	1-121-398-11	10	25 V	elect		R106, 206	1-242-687-09	3.9 k (N)				
C142, 242	1-121-391-11	1	50 V	elect		R107, 207	1-242-705-11	22 k				
C143, 243	1-107-242-11	390 p	50 V	silvered mica		R108, 208	1-242-707-11	27 k				
C144, 244	1-107-170-11	110 p	500 V	silvered mica		R109, 209	1-242-675-11	1.2 k				
C145, 245	1-107-253-11	15+18+22+27p	500V	silvered mica		R110, 210	1-242-715-09	56 k (N)				
C146, 246	1-141-140-00	1~8 p		trimmer		R111, 211	1-242-668-11	620				
						R112, 212	1-242-647-11,	82				
C301	1-121-352-11	47	10 V	elect		R113, 213	1-242-685-09	3.3 k (N)				
C302	1-105-680-12	0.039	50 V	mylar		R114, 214	1-242-655-11	180				
C303	1-121-388-11	1000	35 V	elect		R115, 215	1-242-679-11	1.8 k				
C304	1-121-655-11	330	35 V	elect		R116, 216	1-242-721-11	100 k				
C305	1-121-388-11	1000	35 V	elect		R117, 217	1-221-311-00	5 k (B), adjustable				
C306	1-121-738-11	10	35 V	elect		R118, 218	1-242-667-11	560				
C307	1-121-411-11	47	50 V	elect		R119, 219	1-242-729-11	220 k				
C308	1-117-093-11	0.6+0.4	250 V	MP		R120, 220	1-221-383-00	10 k (B), adjustable				
C309	1-102-222-11	0.001	250 V	ceramic (AEP)		R121, 221	1-244-691-11	5.6 k				
C401	1-121-352-11	47	10 V	elect		R122, 222	1-242-721-09	100 k (N)				
C402	1-121-402-11	33	10 V	elect		R123, 223	1-242-723-09	120 k (N)				
C403	1-121-419-11	220	6.3 V	elect		R124, 224	1-242-705-11	22 k				
C404	1-121-395-11	4.7	25 V	elect		R125, 225	1-242-685-09	3.3 k (N)				
C405	1-121-257-11	4.7	16 V	elect		R126, 226	1-242-685-11	3.3 k				
C406	1-121-415-11	100	16 V	elect		R127, 227	1-242-721-11	100 k				
C407	1-121-395-11	4.7	25 V	elect		R128, 228	1-242-685-11	3.3 k				
C408	1-121-733-11	470	25 V	elect		R129, 229	1-242-685-11	3.3 k				
C501, 601	1-121-392-11	3.3	25 V	elect		R130, 230	1-242-703-11	18 k				
C502, 602	1-121-404-11	33	25 V	elect		R131, 231	1-222-455-00	20 k (A), variable				
C503, 603	1-129-896-21	0.012±2%	100 V	polypropylene		R132, 232	1-242-697-11	10 k				
C504, 604	1-129-701-21	0.01	±2%	100 V	polypropylene	R133, 233	1-244-861-11	330 $\frac{1}{2}$ W				
C505, 605	1-129-899-11	0.056±2%	100 V	polypropylene		R134, 234	1-242-717-11	68 k				
C506, 606	1-121-391-11	1	50 V	elect		R135, 235	1-242-715-09	56 k (N)				
C507, 607	1-107-103-11	6 p	50 V	silvered mica		R136, 236	1-242-697-11	10 k				
C508, 608	1-121-413-11	100	6.3 V	elect		R137, 237	1-242-715-09	56 k (N)				
C509, 609	1-107-119-11	33 p	50 V	silvered mica		R138, 238	1-242-688-09	4.3 k (N)				
C510, 610	1-121-398-11	10	25 V	elect		R139, 239	1-242-697-11	10 k				
C511, 611	1-121-409-11	47	16 V	elect		R140, 240	1-242-664-11	430				
C512, 612	1-105-670-12	0.0056	50 V	mylar		R141, 241	1-242-729-11	220 k				
C513, 613	1-121-402-11	33	10 V	elect		R142, 242	1-242-711-11	39 k				
C514, 614	1-121-651-11	10	16 V	elect		R143, 243	1-242-713-11	47 k				
C515, 615	1-129-794-21	0.0033±2%	100 V	polypropylene		R144, 244	1-242-683-11	2.7 k				
C516, 616	1-121-392-11	3.3	25 V	elect		R145, 245	1-242-645-11	68				
C517, 617	1-127-025-11	3.3	10 V	solid aluminum elect		R146, 246	1-242-671-11	820				
C518, 618	1-105-669-12	0.0047	50 V	mylar		R147, 247	1-242-673-11	1 k				
						R148, 248	1-242-667-11	560				
						R149, 249	1-242-691-11	5.6 k				
						R150, 250	1-242-699-11	12 k				
						R151, 251	1-222-775-00	22 k (B), adjustable				
						R152, 252	1-242-701-11	15 k				
						R153, 253	1-242-697-11	10 k				
						R154, 254	1-242-699-11	12 k				
						R155, 255	1-242-693-11	6.8 k				
<b>RESISTORS</b>												
All resistors are $\frac{1}{2}$ W, carbon type and in $\Omega$ unless otherwise indicated. (k = 1,000) N : low noise												
R101, 201	1-244-723-11	120 k				R102, 202	1-242-705-11	22 k				
R103, 203	1-242-687-09	3.9 k (N)										

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>		<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	
R156, 256	1-242-733-11	330 k		R421	1-244-709-11	33 k	
R157, 257	1-242-715-11	56 k		R422	1-244-701-11	15 k	
R158, 258	1-244-863-11	390	½ W	R423	1-244-705-11	22 k	
R159, 259	1-242-691-11	5.6 k		R424	1-244-709-11	33 k	
R160, 260	1-242-675-11	1.2 k		R425	1-244-709-11	33 k	
R161, 261	1-242-713-11	47 k		R426	1-244-867-11	560	½ W
R162, 262	1-244-637-11	33		R427	1-244-697-11	10 k	
R163, 263	1-244-633-11	22		R428	1-244-673-11	1 k	
R164, 264	1-244-687-11	3.9 k		R429	1-244-601-11	1	
R165, 265	1-242-699-11	12 k		R430	1-206-652-11	330	2 W metal oxide
R166, 266	1-242-731-11	270 k		R501, 601	1-210-858-11	200 k	± 2 %
R167, 267	1-242-735-11	390 k		R502, 602	1-210-854-11	27 k	± 2 %
R168, 268	1-242-681-11	2.2 k		R503, 603	1-242-729-09	220 k (N)	
R169, 269	1-242-677-11	1.5 k		R504, 604	1-242-719-09	82 k (N)	
R170, 270	1-242-695-11	8.2 k		R505, 605	1-242-699-09	12 k (N)	
R171, 271	1-222-773-00	4.7 k (B), adjustable		R506, 606	1-242-737-09	470 k (N)	
R172, 272	1-242-629-11	15		R507, 607	1-242-737-09	470 k (N)	
R173, 273	1-242-691-11	5.6 k		R508, 608	1-242-641-11	47	
R301	1-242-683-11	2.7 k		R509, 609	1-210-853-11	6.2 k	± 2 %
R302	1-242-729-11	220 k		R510, 610	1-242-719-09	82 k (N)	
R303	1-242-613-11	3.3		R511, 611	1-242-721-09	100 k (N)	
R304	1-206-658-11	560	2 W metal oxide	R512, 612	1-242-701-09	15 k (N)	
R305	1-206-647-11	200	2 W metal oxide	R513, 613	1-242-721-09	100 k (N)	
R306	1-202-551-11	120	½ W composition	R514, 614	1-242-695-09	8.2 k (N)	
R307	1-206-658-11	560	2 W metal oxide	R515, 615	1-242-687-11	3.9 k	
R308	1-242-653-11	150		R516, 616	1-210-856-11	68 k	± 2 %
R309	1-206-660-11	680	2 W metal oxide	R517, 617	1-210-815-11	910	± 2 %
R310	1-206-658-11	560	2 W metal oxide	R518, 618	1-242-689-11	4.7 k	
R311	1-202-525-11	10	½ W composition	R519, 619	1-242-677-11	1.5 k	
R312	1-242-683-11	2.7 k		R520, 620	1-242-721-11	100 k	
R313	1-246-673-11	1 k		R521, 621	1-242-719-11	82 k	
R314	1-242-709-11	33 k		R522, 622	1-242-701-11	15 k	
R315	1-202-693-11	6.8 k	½ W composition	R523, 623	1-242-723-11	120 k	
R401	1-244-669-11	680		R524, 624	1-242-695-11	8.2 k	
R402	1-242-721-11	100 k		R525, 625	1-210-850-11	300	± 2 %
R403, 404	1-242-705-11	22 k		R526, 626	1-242-705-11	22 k	
R405	1-242-637-11	33		R527, 627	1-242-695-11	8.2 k	
R406	1-242-681-11	2.2 k		R528, 628	1-210-855-11	33 k	± 2 %
R407	1-242-669-11	680		R529, 629	1-210-855-11	33 k	± 2 %
R408	1-242-709-11	33 k		R530, 630	1-210-852-11	5.6 k	± 2 %
R409	1-242-705-11	22 k		R531, 631	1-242-601-11	1	
R410	1-242-701-11	15 k		R532, 632	1-242-701-11	15 k	
R411	1-244-633-11	22		R533, 633	1-242-719-11	82 k	
R412, 413	1-244-705-11	22 k		R534, 634	1-242-713-11	47 k	
R414	1-244-723-11	120 k		R535, 635	1-242-727-11	180 k	
R415	1-244-709-11	33 k		R536, 636	1-242-727-11	180 k	
R416	1-244-665-11	470		R537, 637	1-242-637-11	33	
R417	1-244-709-11	33 k		R538, 638	1-242-721-11	100 k	
R418	1-244-723-11	120 k		R539, 639	1-242-653-11	150	
R419	1-244-713-11	47 k					
R420	1-244-697-11	10 k					
				S1, 2	1-514-976-00	slide, record/playback	

SWITCHES

TOP

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
S3	1-513-273-00	slide, timing	ME101, 201	1-524-078-21	meter, level
S4	1-516-128-00	lever slide; TAPE SELECT		1-534-587-11	cord, power (AEP)
S5	1-516-126-00	lever, LIMITER		1-534-487-22	cord, power (General Export)
S6	1-514-415-21	slide, HEADPHONE LEVEL		1-536-179-11	terminal strip, 1-L-1
S7	{ 1-514-472-21	seesaw, POWER (AEP)		1-536-180-00	terminal strip, 1-L-2
	{ 1-514-655-31	seesaw, POWER (General Export)	CP 1	1-464-015-00	bias osc unit 1-464-015-00
S8	1-516-126-00	lever, DOLBY	LPF 1	1-231-219-00	encapsulated component, low pass filter
S9	1-514-478-00	slide, SELECTOR	CP 2	{ 1-231-057-31	encapsulated component, CR (AEP)
S10	{ 1-514-472-21	seesaw, frequency (AEP)		{ 1-231-057-00	encapsulated component, CR (General Export)
	{ 1-514-655-31	seesaw, frequency (General Export)	RPH	8-821-936-20	head, record/playback: (PF133-3602)
S11	1-514-266-00	leaf, STOP	EH	8-825-836-05	head, erase; (EF110-36E)
S12	1-514-266-00	leaf, PAUSE	M	8-831-414-02	motor, HC-414B
S13	1-516-134-00	leaf, fast forward	PM 1	1-454-096-00	solenoid
S14	1-514-880-00	leaf, rewind	FG 401	1-452-071-00	ferrite magnet ring
S15	1-516-133-00	slide, MEMORY	F1	1-532-066-00	fuse, 400 mAT (AEP)
S16		COUNTER, included in tape index counter	F2	1-532-275-00	fuse, 160 mAT (AEP)
<b>JACKS</b>					
J1, 2	1-507-275-00	M-7A, MICROPHONE	F3	1-532-275-00	fuse, 160 mAT (AEP)
J3	1-507-282-00	binaural, HEADPHONE	F4	1-532-284-00	fuse, 630 mAT (AEP)
	1-507-901-02	jack nut (A)	F5	1-532-079-00	fuse, 160 mA (AEP)
CNJ1	1-507-142-00	phono (2 p); LINE IN		1-533-027-00	holder, fuse (AEP)
CNJ2	1-507-142-00	phono (2 p); LINE OUT	F	1-532-132-11	fuse, 0.5 A (General Export)
<b>MISCELLANEOUS</b>					
PL 1 ~ 5	1-518-129-31	lamp, 4.5 V 40 mA		1-533-007-00	holder, fuse (General Export)
				1-509-359-00	connector, REC/PB
			VS	{ 1-509-482-00	socket, voltage selector (AEP)
				{ 1-509-427-00	socket, voltage selector (General Export)

## **SECTION 7**

## **HARDWARE**

<u>Part No.</u>	<u>Description</u>	<u>Part No.</u>	<u>Description</u>
<b><u>SCREWS</u></b>			
All screws are phillips type (cross recess type) unless otherwise indicated. (-) : slotted head.			
7-621-255-25	P 2 x 4	7-623-105-12	2 mm dia (middle)
7-621-255-35	P 2 x 5	7-623-107-02	2.6 mm dia (small)
7-621-255-45	P 2 x 6	7-623-107-12	2.6 mm dia (middle)
7-621-259-15	P 2.6 x 3	7-623-108-12	3 mm dia (middle)
7-621-259-25	P 2.6 x 4	7-623-205-22	2 mm dia, spring
7-621-259-35	P 2.6 x 5	7-623-207-22	2.6 mm dia, spring
7-621-259-45	P 2.6 x 6	7-623-208-22	3 mm dia, spring
7-621-710-29	(-) SCM 2 x 3, set	7-622-108-02	3 mm dia
7-621-710-56	(-) SCM 2 x 6, set	7-622-308-12	3 mm dia
7-621-714-18	(-) SCM 1.7 x 3, set		
7-621-773-86	B 2.6 x 4		
7-621-773-89	B 2.6 x 3		
7-682-146-01	P 3 x 5	7-623-508-11	3 mm dia, egg type
7-682-148-01	P 3 x 8		
7-682-149-01	P 3 x 10		
7-682-150-01	P 3 x 12		
7-682-249-20	K 3 x 10, polycarbonate (AEP)	7-624-102-01	E-1.5
7-682-548-01	B 3 x 8	7-624-104-01	E-2
7-682-646-01	PS 3 x 5	7-624-106-01	E-3
7-682-648-01	PS 3 x 8	7-624-122-11	C-1.5 (C type)
7-682-649-01	PS 3 x 10		
7-682-650-01	PS 3 x 12		
7-682-946-00	PSW 3 x 5		
7-682-953-00	PSW 3 x 20	7-671-112-01	2 mm dia
7-685-145-21	P 3 x 6, self tapping		
7-685-545-23	B 3 x 6, self tapping		
<b><u>WASHERS</u></b>			
<b><u>NUTS</u></b>			
<b><u>LUG</u></b>			
<b><u>RETAINING RINGS</u></b>			
<b><u>STEEL BALL</u></b>			

## — Hardware Nomenclature —

P	Pan Head Screw .....		
PS	Pan Head Screw with Spring Washer .....		
K	Flat Countersunk Head Screw .....		
B	Binding Head Screw .....		
RK	Oval Countersunk Head Screw .....		
T	Truss Head Screw .....		
R	Round Head Screw .....		
F	Flat Fillister Head Screw .....		
SC	Set Screw .....		
E	Retaining Ring (E Washer) .....		